STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 13

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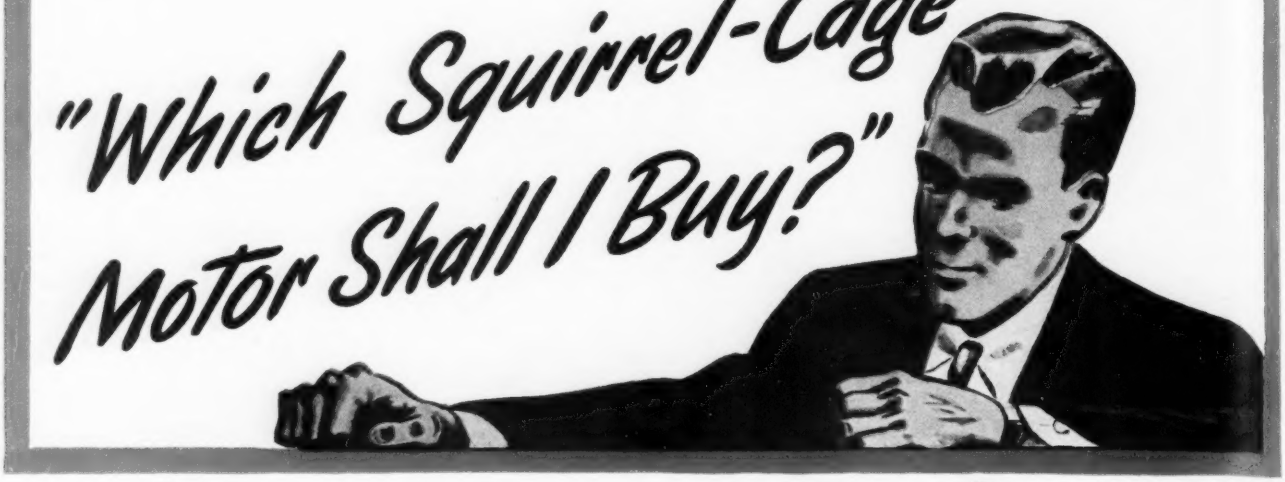

Open-Type? This general-purpose squirrel-cage motor meets about 9 out of every 10 application requirements; so chances are it's the design you'll select. Allis-Chalmers builds generously proportioned, rugged *open-type* squirrel-cage motors in sizes from 1 hp to the largest practical requirement.

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Are Motor Decisions More Important Today?

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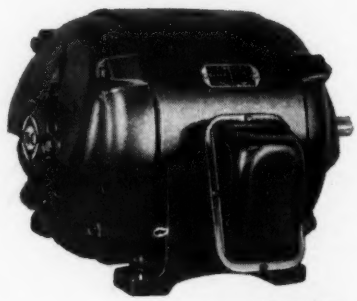

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Sulphur in Fuel Oil

Carbon Elimination with Oxygen

Gaging Sheet Thickness by X-Ray

STEEL

The Magazine of Metalworking and Metalproducing

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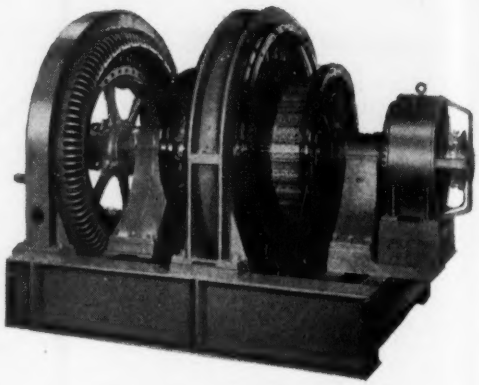

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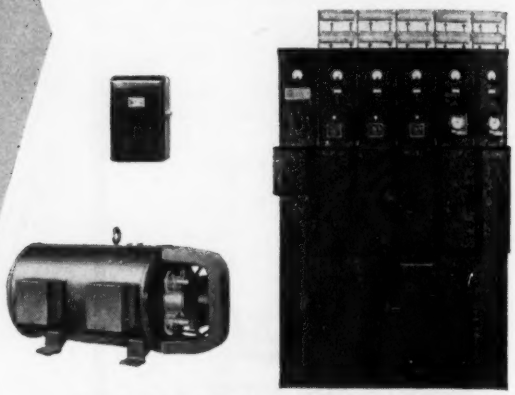

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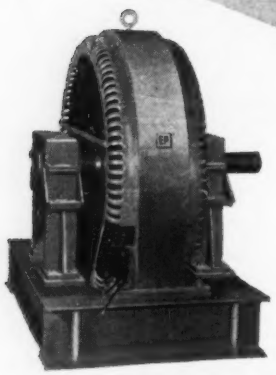

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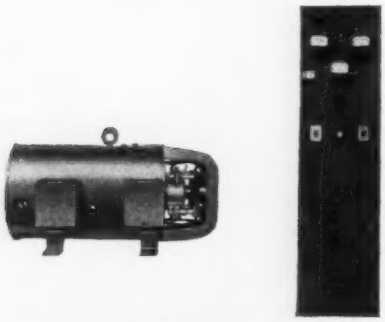

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January 26, 1948

Steel's U Q

In every discussion of steel produced, steel distributed, steelmaking capacity or any other factor bearing upon the present or future supply of steel, the argument always centers around the amount of steel as measured in net tons.

This is natural because tonnage is the orthodox unit for measuring volume. However, it is evident that the utility value of steel changes from time to time. Everybody realizes that a ton of steel ingots in 1947 benefitted mankind much more than did a ton of steel ingots produced say in 1922—25 years ago.

This is true for many reasons. One is that the number of varieties and forms of steel rolled from ingots has increased tremendously during this 25-year period, with the result that today a greater proportion of finished steel consumed is much better adapted to the purpose for which it was purchased than was the case in 1922.

Another reason is that in all of the operations from the shipping platform of the steel mill to the time the steel emerges as an integral part of a manufactured article, there have been improvements that have had the effect of making a ton of finished steel go much farther in meeting man's needs in 1947 than was the case in 1922.

One could go on at great length in citing developments during the quarter-century that have increased the utility of steel substantially. Would it not be in order—in considering needs for steel in the future—to think of the problem more in terms of steel's utility and less in terms of the mere tonnage of steel?

One wishes that it could be possible to compile a "utility quotient" for steel —a U Q number that would denote the utility of steel just as the I Q number denotes the intelligence of a person.

The U Q criterion would have the great advantage of emphasizing the fact that users as well as producers have a responsibility when steel is scarce. Today the onus for steel shortage is heaped upon the producers, yet there are unlimited opportunities for consumers to ease the shortage by using steel more intelligently.

Now is a good time for all hands to boost steel's U Q.

* * *

SCRAP FOR TOMORROW: Opinion expressed at the 20th annual convention of the Institute of Scrap Iron & Steel Inc. at Chicago last week was unique in that it dealt not only with the short-term outlook for scrap supply but also considered in more detail than usual the probable scrap requirements more than a decade hence.

Most of the speakers agreed that scrap needs in 1948 will continue to challenge the best efforts of everybody connected with the industry. If steel output amounts to about 88 million tons, as anticipated, then 26,400,000 tons of purchased scrap will be needed, as compared with the record-breaking total of 25,400,000 tons purchased in 1947.

Looking forward to 1970, one speaker estimated that a least 36 million tons of purchased scrap will be needed for the production of an estimated 97 million tons of steel, assuming of course that we continue to rely upon open-hearth furnaces for the major part of our steel output.

In meeting either the short-range or long-

(OVER)

range target, it will be necessary to make marked progress in restoring the traditional scrap cycle that was distorted badly during the war. It is gratifying to note that most of the comment on scrap supply expressed at the convention was a shade more optimistic than the general attitude reflected in discussions of the subject six months or a year ago. This may be a sign that the seriousness of the problem has been recognized more widely and that there is a greater unity of purpose in attempts to solve it than heretofore. —p. 26

* * *

LURE OF SIREN STEEL: Two items in the news illustrate the lengths to which men will go in their quest for scarce steel.

In a deal as bizarre as anything that has intrigued the steel industry in many years, a former broker who apparently operates under several aliases sought to purchase control of Follansbee Steel Corp. for $9,150,000. Last week, Preston Tucker, whose revolutionary car is not yet in production, complained that "somebody in War Assets Administration is blocking me" in his attempt to buy a blast furnace and coke plant for $8 million or more.

Their boldness almost matches that of the late Van Sweringen brothers who purchased the entire Nickel Plate system in order to obtain a five-mile right of way for an urban rapid transit line. —p. 23

* * *

BREAK-EVEN POINT: Henry Ford II told a New York audience that on the basis of producing the same number of cars and trucks annually, Ford Motor Co. found the cost of doing business on Dec. 1, 1947, was $100 million more than it was on Dec. 1, 1946. Figuring Ford's output at about a million cars and trucks a year, this means a cost increase of $100 per unit in 12 months.

Mr. Ford referred to the company's margin of profit as "the minimum we consider necessary to provide the funds we need to stay in business and to improve our plants, manufacturing techniques and products."

This would seem to indicate that the Ford company is concerned with a problem that is common to almost every producer, fabricator, distributor and manufacturer in the metalworking industries. That problem is a too high break-even point. How to lower it before volume of business shrinks, prices drop or costs increase even more should be management's current No. 1 headache. —p. 36

* * *

CLARIFYING THE LAW: For the first time in history the annual report of the Federal Trade Commission to Congress was accompanied by a "minority" report. Commissioner Lowell Mason, author of the "minority" recommendations, accuses the commission of ineffectiveness and asks approval of a bill authorizing the proper government officials—through adoption of a trade practice rule for an industry—to advise business men in advance of a court test that a given act was not, in their opinion, in violation of antitrust laws. The bill would give business men complete immunity from prosecution for any act or failure to act resulting from conformity to such a rule.

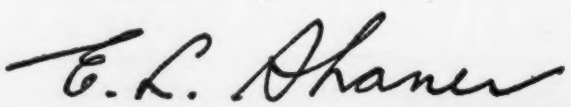
Industrial executives will welcome anything that will help to clarify what they can or cannot do under the present antitrust laws. —p. 28

* * *

NOT DOOMED FOREVER: At the meeting of the Society of Automotive Engineers in Detroit two weeks ago E. R. Grace of Grant Advertising Inc. declared that an extensive survey shows that "regardless of age, sex or income, 60.4 per cent of the American public believes that the leading motor car manufacturers should produce smaller, lighter cars (not midgets) at substantially lower prices than are now being charged."

Consensus of opinion in motordom is that the lighter, lower priced car is impossible under present conditions. It is pointed out that reducing the size and weight of a car does not necessarily lower its cost and also that two postwar light car projects already have been abandoned because of cost limitations.

This does not mean that the dream of a lighter and cheaper car is doomed forever. It is a safe bet that once inflation has run its course, the easy-money market has been satisfied and steel and components are more plentiful, the competition among some car builders for the low-price market will exceed anything we have experienced in the past. —p. 35



EDITOR-IN-CHIEF

News Summary

ALLOCATIONS—Will the voluntary allocations program work out satisfactorily? Or will it be replaced by a compulsory program? These are questions being asked in Washington as the machinery for the voluntary program (p. 21) slowly takes shape. Government administrators openly doubt the effectiveness of the co-operative plan, make no secret of the fact they prefer compulsory allocations. Twenty-three producers' representatives have been named to an industry advisory committee, will meet in Washington Jan. 30 to further steel allocation plans. Meanwhile the Senate Small Business Committee stresses the necessity for a comprehensive survey of domestic steel requirements before definite commitments are made for greater shipments abroad.

SPECIAL MACHINES—Manufacturers of equipment for food processing, graphic arts, textiles, paper, woodworking, oil refining and other specialized machinery are enjoying booming business, despite acute materials problems. Some companies (p. 32) report their business in special machinery is 1000 per cent above prewar. Further gains are anticipated this year.

BASING POINTS—Legality of the basing point pricing system per se is being tested in the United States Circuit Court of Appeals in Chicago where the rigid steel conduit industry has appealed (p. 27) a Federal Trade Commission cease and desist order. The case is unusual chiefly in that it is not complicated by charges of collusion or conspiracy which have clouded other basing point cases.

RIFT IN FTC—Annual report of the Federal Trade Commission to Congress again brings to light the difference in opinion among the commission's members as to the proper methods of dealing with business under the antitrust laws (p. 28). A minority report, inserted by Commissioner Lowell Mason, calls for changes designed to bring a better understanding of what is permissible and what is not before prosecution is started.

SCRAP—Prospects for easier scrap supply over the coming months are not encouraging. This is the consensus of the men who handle the huge volume of purchased scrap used by steel mills and foundries (p. 26) expressed at the dealers' convention in Chicago. The scrap industry, with a record year behind it, is raising its sights for 1948 to keep mills and foundries operating.

LIGHTER CARS?—While public opinion, as revealed by surveys, indicates a growing favor for smaller, light automobiles, the automakers (p. 35) believe this opinion is based on a fallacious belief that lightness and low cost are synonymous. Actually, they point out, reducing weight may increase costs.

FOREIGN—Higher steel quotas for the more vital British industries will be provided (p. 31) under new allocations announced by the chancellor of the exchequer. The additional amount of steel allocated is greater than the increase in British production, however, indicating that less essential industries will have less steel than heretofore.

SIGNS OF THE TIMES—In 1946, labor union leaders made excessive demands against the American Zinc & Chemical Co. at Langeloth, Pa., caused a paralyzing 108-day strike. Financial losses were considerable. Equipment deteriorated. Last week the plant started to close (p. 27), causing a loss of employment to 800 workers and a $9000 daily payroll. Workers now are bewailing the union's "tough" attitude. . . . Follansbee Steel Corp. stock deal, which excited steel and financial circles recently, is revealed as a stock market manipulation (p. 23). . . . Canadian import restrictions spell a tighter steel supply for metalworking companies north of the border who previously had been depending partly on United States steel supplies (p. 38). . . . Truck loadings (p. 40) show a long range gain. . . . Mexico has installed an aluminum sheet rolling mill, (p. 25) operating on Canadian ingots. . . . Price indexes (p. 40) continue to edge upwards.

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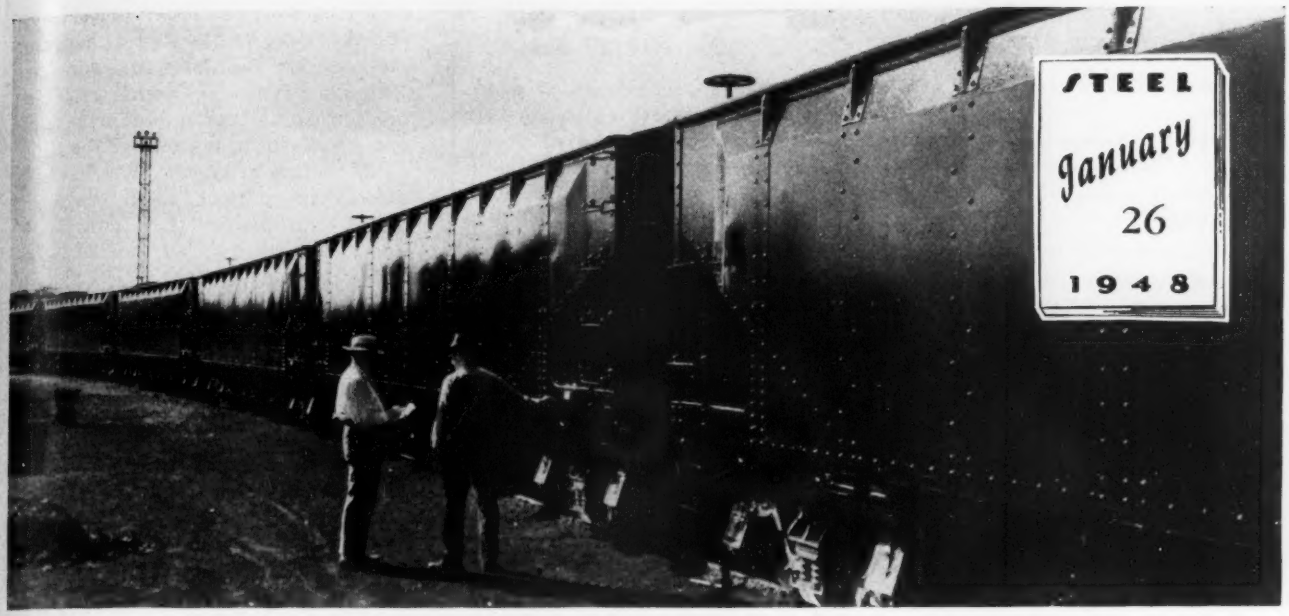


Freight car builders, chief beneficiaries under voluntary steel allocations to date, are looking for more steel when the new program gets underway

Allocations Organization Listless

Administration officials lack enthusiasm for voluntary program. Still hope for compulsory controls. Steel Producers Advisory Committee named; will meet Jan. 30

ORGANIZATION for the voluntary allocations of steel and other scarce materials is moving listlessly through the formative stages.

Reasons for this slow progress are several. One is that the administration officials in charge do not favor the voluntary program; they want compulsory allocations and have not given up hope that such stronger powers yet may be obtained.

Little pressure for quick action is being exerted by the industry. Producers realize that the pie is just so big and that no matter how it is cut it won't go any farther.

Steel consumers are beginning to realize that only a small percentage of their number will get more steel under the allocations program and that many will continue to face difficult procurement problems.

So the voluntary program is being set up, industry advisory committees are being organized and meetings are being scheduled, but little enthusiasm is being generated in the process.

Compulsion Coming?—Whether or not the administration will be able to obtain compulsory control powers at a later date is a question receiving much attention in Washington and throughout the industry. Capitol Hill opinion is that the Senate will approve some allocation and rationing and possibly some price controls, but that the House will not go along with the Senate. Support for compulsory controls to combat inflation unquestionably is growing in the Senate.

The Senate Committee on Banking & Currency, which is receiving the views of industrial and business leaders on anti-inflation measures, has before it several bills providing for compulsory controls. These include: S. 1888, introduced by Sen. Alben Barkley, which would grant the President's full control program; S. 1923 introduced by Senator Taylor, which calls for rationing and price freeze at the November levels; S. 1873, introduced by Senator Capehart, calling for a price freeze at the Dec. 13 level pending formulation of a long-range policy as the result of further study; a meat rationing bill, introduced by Senator Flanders.

Steel Committee Opposes Controls—While sentiment in favor of compulsory action increased among some senators, an opposite view was expressed by the Steel (Martin) subcommittee of the Senate Small Business Committee. This group, which has been investigating the situation in steel since last April, went on record against the return of even limited allocation and priority power over steel supply.

"However limited or sparingly used," the committee said, "it will have, in the opinion of this committee, the effect of slowing down production. It is one thing to gird the nation for war and to command its every facility for war production and quite another to place the same kind of imposition upon industry in peacetime."

The Martin committee, however, asked for a "full and complete investigation" by the Federal Trade Commission into the following practices:

1. Withdrawal of steel companies from established distribution in some areas.

2. Acquisition of steel facilities by other steel companies and removal of the purchased steel facility from normal trade in the area served.

3. Acquisition of steel producing facilities by the larger steel consuming companies to assure complete production for their own use.

4. Sales of steel products by steel companies to their integrated operations and a comparison of such

STEEL PRODUCERS ADVISORY COMMITTEE

TWENTY-THREE representatives of integrated, semi-integrated and nonintegrated steel companies have been invited to serve on the Steel Producers Advisory Committee to consider the establishment of procedures to carry out the voluntary allocations program. The committee will meet with Commerce Department officials in Washington Jan. 30. Members include:

J. T. Whiting, president, Alan Wood Steel Co., Conshohocken, Pa.

C. R. Hook, president, American Rolling Mill Co., Middletown, O.

C. S. Stone, Atlantic Steel Co., Atlanta, Ga.

A. B. Homer, president, Bethlehem Steel Corp., Bethlehem, Pa.

W. R. Howell, president, Bliss & Laughlin Inc., Harvey, Ill.

Wilbert Wear, president, Harrisburg Steel Co., Harrisburg, Pa.

C. W. Meyers, president, Colorado Fuel & Iron Corp., Denver, Colo.

E. L. Parker, president, Columbia Steel Shafting Co., Pittsburgh.

R. K. Clifford, president, Continental Steel Corp., Kokomo, Ind.

David Bell, president, Edgewater Steel Co., Pittsburgh.

Lauson Stone, president, Follansbee Steel Corp., Pittsburgh.

Hayward Niedringhaus, president, Granite City Steel Co., Granite City, Ill.

E. L. Ryerson, chairman, Inland Steel Co., Chicago.

Ben Moreell, chairman & president, Jones & Laughlin Steel Corp., Pittsburgh.

R. W. Wolcott, president, Lukens Steel Co., Coatesville, Pa.

Paul Dillon, Northwestern Steel & Wire Co., Sterling, Ill.

C. M. White, president, Republic Steel Corp., Cleveland.

L. E. Creighton, Rotary Electric Steel Co., Detroit.

H. A. Roemer, chairman, Sharon Steel Corp., Sharon, Pa.

B. F. Fairless, president, U. S. Steel Corp., Pittsburgh.

Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown, O.

E. T. Weir, chairman, National Steel Corp., Pittsburgh.

H. J. Kaiser, president, Kaiser Co. Inc., Oakland, Calif.

sales with those to independent companies, at all levels of operations.

Criticizes Export Controls—The report is critical of the administration of export controls by the Department of Commerce and asks for a complete survey of domestic steel requirements as a prelude to establishing export quotas.

Implications of the European Recovery Plan indicate to the committee added pressures for exports of steel, which already are at a level far in excess of what the domestic economy can support. The committee asks that businessmen shall have ample opportunity to express themselves before commitments to Europe are made. "It will profit us little, either in the immediate problems or in longer range considerations, to foster the flame of free enterprise in Western Europe, if we must submit our own economy to regimentation."

The committee warns the industry that if it wants to avoid compulsory controls, each company should assume responsibility for checking its own sales to wipe out the gray market in steel and that the voluntary agreements under the allocations program now being formulated be made effective in getting steel to the essential programs.

Advisory Committee Named — In furtherance of the voluntary allocations program, the Department of Commerce has announced the membership of the Steel Producers Advisory Committee (see accompanying box) and is proceeding with the organization of the program.

The Office of Industry Co-operation has added several men, in addition to the services available from career men in the Department of Commerce. Assisting the director, John C. Virden, are Earl Clark, Carl Foutz and James Kessler. Mr. Clark will be Mr. Virden's chief aide on the administration of the office. Mr. Foutz will have charge of dealing with industries enrolled in the program. Mr. Kessler will act as assistant to Mr. Clark and Mr. Foutz.

The steel producers advisory committee will meet with Mr. Virden in Washington Jan. 30. Whether or not the committee will actually get down to the problem of allocating steel at this meeting is uncertain.

One allocations conference was held in Mr. Virden's office last week; the representatives of the Interior Department were in on Jan. 20. They included Walton Seymour, spearheading the electric power generating expansion program, and Max W. Ball, head of Interior's Oil and Gas Division. Of the power generating and fuel programs, the latter presents by far the more difficult and complex picture. Mr. Ball later met with the National Petroleum Council to determine what sort of a petroleum and gas expansion is feasible in the light of all factors involved. When he and Mr. Seymour have their programs shaped up better, they will make allocations requests to the Office of Industry Co-operation.

More Sessions Scheduled — Three meetings are scheduled to be held this week. One of them will be a one-day conference, in Mr. Virden's office on Jan. 27, with the farm machinery industry. This meeting will be purely of an exploratory nature. The government wants an increase over the $1,200,000,000 of farm machinery production of 1947, and the meeting on Jan. 27 will aim at ascertaining what can be done. If it is decided that a voluntary allocations program—involving steel or other materials, or components—is needed to carry out an expansion in this type of production, a farm equipment advisory committee will be appointed.

Another meeting this week will be a two-day conference Jan. 27 and 28 between the Office of Defense Transportation and the task committee from the steel industry which last year worked with ODT on providing steel for the freight car program. As previously reported in STEEL, the freight car production program is to be upped as of April 1 from 10,000 to 14,000 units per month. In addition, the railroads need more steel for maintenance and repairs than the 75,000 tons monthly they have been getting. They also need an indefinite tonnage of steel for new locomotives, as well as an indefinite tonnage of rails.

X-ray Gage for Measuring Sheet Thickness Invented

Westinghouse Electric Corp., East Pittsburgh, Pa., revealed in New York last week that it had developed an x-ray gage for measuring the thickness of cold-rolled sheets and cold-rolled copper. The new gage makes no contact with the material, responds instantly to changes and provides access to areas never before gaged. H. D. Moreland, manager of the Westinghouse x-ray division, indicated that the gage will increase output of prime sheet, solve some operating problems and eliminate marring of the surface of materials being gaged. Jones & Laughlin Steel Corp. already is using the instrument on a classifier and shear line in its tin plate mill at Aliquippa, Pa.

Follansbee Deal Evaporates

FEARS of metalworking firms served by Follansbee Steel Corp., Pittsburgh, that their sources of steel would be disrupted by sale of the company have been allayed by collapse of a purported deal which was followed by arrest of the central figure, A. Terry Fahye.

Mr. Fahye, also identified as Albert Bennett-Fey and Alan Adams Haye, was arrested at the order of Attorney General Nathaniel L. Goldstein of New York state after questioning concerning the proposed $9,150,000 purchase of 183,000 shares of the steel company's stock.

John W. M. Rutenberg, assistant attorney general of New York state, said it undoubtedly was the purpose of Mr. Fahye to obtain control of Follansbee and to sell it to the big users of steel. However, Mr. Rutenberg brought out that Fahye had two bank accounts—one containing $54 and the other 58c—at a time when the latter was engineering a multi-million-dollar transaction. Attorney General Goldstein reported that Mr. Fahye was the Albert Bennett-Fey, a former broker who was enjoined in the New York Supreme Court in November, 1939, from ever engaging in security deals in New York.

Mr. Fahye's attempted deal prompted Follansbee Steel Corp. directors to meet and authorize the company's president and chairman, Lauson Stone, to reiterate that neither the corporation, its officers, directors or other personnel participated in any way in Mr. Fahye's scheme. Final yearend figures for 1947, Mr. Stone said, will show the corporation continues to be in an unusually sound financial position.

Steel Capacity Increase Seen in Plant Purchase

Eventual expansion of steelmaking capacity was seen in the announcement that International Detrola Corp., Detroit, has purchased a government surplus electric furnace steel plant at Newport, Ky., for $1,350,000.

The plant, adjoining the Newport Rolling Mill Division of Andrews Steel Co., now owned by International Detrola, was built for the war program to produce electric furnace alloy ingots for gun forgings but was never completed. Original acquisition cost was about $5½ million. The property consists of approximately 10 acres of land, an electric furnace building with one 60-ton electric furnace, and an ingot conditioning building.

War Assets Administration said it was informed by the purchaser of plans to convert the electric furnace building into an openhearth plant to have an eventual capacity of 720,000 tons of ingots a year, exclusive of the annual capacity of 72,000 tons from the electric furnace. International Detrola also plans to install soaking pits in the conditioning building, a breakdown mill and a hot strip mill capable of producing 45,000 tons per month.

Tucker Opens Fight For Ohio Blast Furnace

Seeking sources of materials and supplies, Tucker Corp., fledgling automobile concern of Chicago, declared it was high bidder and began a fight last week to have sale of a government-owned blast furnace and coke plant at Cleveland awarded to it rather than to the current operator and only other bidder, Republic Steel Corp.

The blast furnace, known as Republic No. 5, is noted both for its size and for its use of high top pressures. The furnace and coke plant originally cost the government around $28 million.

Republic bid $4,748,000 for the coke plant and offered to lease the blast furnace facilities, including a powerhouse and a large iron ore unloading dock, for not less than $25,000 a month, with option to buy the stack for $7,669,300.

Tucker Corp. offered to buy the coke plant and blast furnace for $8 million, with 20 per cent down and the balance quarterly over a ten-year period with 4 per cent interest. Alternatively, Tucker offered $10 million with 10 per cent down and the remainder payable on a production basis with minimum annual payments of $500,000. Two offers to lease were made by Tucker. One would be at an annual rental of $1,120,000 with an option to purchase for $15 million, and the other a lease with a $500,000 yearly guarantee.

Present, Past and Pending

■ KOPPERS CO. IS NOW SOLE OWNER OF PLANT

PITTSBURGH—Koppers Co. Inc. has become sole owner of Missouri-Illinois Furnace Inc. by purchasing the half interest of Hanna Coal & Ore Corp., Cleveland. Missouri-Illinois was formed to buy the government-owned blast furnace and coke plant at Granite City, Ill.

■ NEW SAFETY DEVICE FOR MINES ANNOUNCED

PITTSBURGH—A safety device, known as a safety circuit center, to prevent faulty electrical mining equipment from emitting explosion-causing sparks has been announced by Mines Equipment Co. of St. Louis and Westinghouse Electric Corp.

■ MACHINE TOOL SHIPMENTS RISE IN DECEMBER

CLEVELAND—Estimated shipments of the machine tool industry in December rose to $28,873,000, second highest monthly total for 1947. Shipments for the year are estimated at $300,063,000. Dollar volume of new orders in December was exceeded in only two other months of the year.

■ U. S. STEEL CORP. TO AID IN ATOMIC RESEARCH

CHICAGO—United States Steel Corp. is the eighth industrial concern to become a partner with the University of Chicago in helping to finance the latter's $12 million atomic research program.

■ WELDMENT MANUFACTURERS ASSOCIATION FORMED

MILWAUKEE—An American Weldment Manufacturers Association to promote understanding among welders and users of welded products and to solve problems facing the welding industry has been formed with Ken F. Ode, superintendent, Welding Division, the Falk Corp., Milwaukee, as president.

■ JESSOP STEEL CO. PRESIDENT RESIGNS

WASHINGTON, PA.—Fred T. H. Youngman is resigning from the presidency of Jessop Steel Co., effective Jan. 26.

Steel Shipment Pattern Holds

Auto industry continues as leading consumer. October distribution sets new monthly record for 1947, pushes tonnage of first ten months above full year of 1946

THE AUTOMOTIVE industry retained in October, 1947, its No. 1 place in receipts of finished steel. Although that industry received a slightly smaller percentage of total shipments in October than in September, it did, however, get a greater tonnage in October than in any of the preceding months of 1947 because total shipments in October set a new monthly record for that year. The automotive industry's percentage of total October shipments was 13.9, compared with 14.2 in September.

In the first ten months of 1947 the automotive industry received 13.9 per cent of all finished steel shipments, compared with 12.5 per cent in all of 1946.

Ranks of other principal consumers of steel in October were unchanged from September. The construction and maintenance industry was in second place, containers in third, and rail transportation in fourth place. That order also applies for the first ten months of 1947.

Little change occurred percentagewise in shipments to warehouse distributors in October, their receipts that month amounting to 16.7 per cent, compared with 16.8 in September. However, for the first ten months of 1947 their proportion was only 16.6 per cent, compared with 19 per cent for all of 1946.

Exports constituted 6.8 per cent of mill shipments in October, while for the first ten months of the year they accounted for 6.6 per cent.

With October's net total of finished steel shipments amounting to 5,681,597 net tons, the total for the first ten months of 1947 was boosted to 52,201,821 net tons, exceeding the 48,775,532 tons shipped in all of 1946.

Mill shipments of alloy steel products during the first ten months of 1947 exceeded those of the corresponding period of 1946 by 29 per cent, the movement in the 1947 period amounting to 3,469,535 tons, compared with 2,686,936 in the preceding year's first ten months (see chart on opposite page.)

Steel Distribution 10 Months, 1947

(Leading products, all grades including alloy and stainless)

Market Classification	Net Total (All Products) In Net Tons
Converting and Processing	4,720,273
Jobbers, Dealers, Distributors	8,706,470
Construction, Maintenance	5,177,358
Contractors' Products	1,858,943
Automotive, excl. Tractors	7,305,827
Rail Transportation	4,061,027
Shipbuilding	262,802
Aircraft	31,867
Oil, Gas Drilling	747,454
Mining, Quarrying, Lumbering	238,286
Agricultural	1,021,357
Machinery, Industrial Equip., Tools	2,601,466
Elect. Machinery, Equip.	1,327,927
Appliances, Utensils, Cutlery	1,306,289
Other Domestic, Commercial Equip.	1,398,726
Containers	4,199,267
Ordnance, other military	41,080
Unclassified	3,730,959
Export	3,464,443
Total	52,201,821

November Shipments of Finished Steel Reported

Shipments of 5,216,990 net tons of finished steel products in November brought the 11-month total to 57,523,829 net tons, American Iron & Steel Institute discloses. This total was 17.9 per cent greater than the amount of finished steel shipped during the entire 1946 year.

An additional 487,608 net tons was shipped during the latest month to members of the industry for conversion into further finished products or for resale, to bring the total shipped for these purposes in 1947's first 11 months to 5,056,323 net tons.

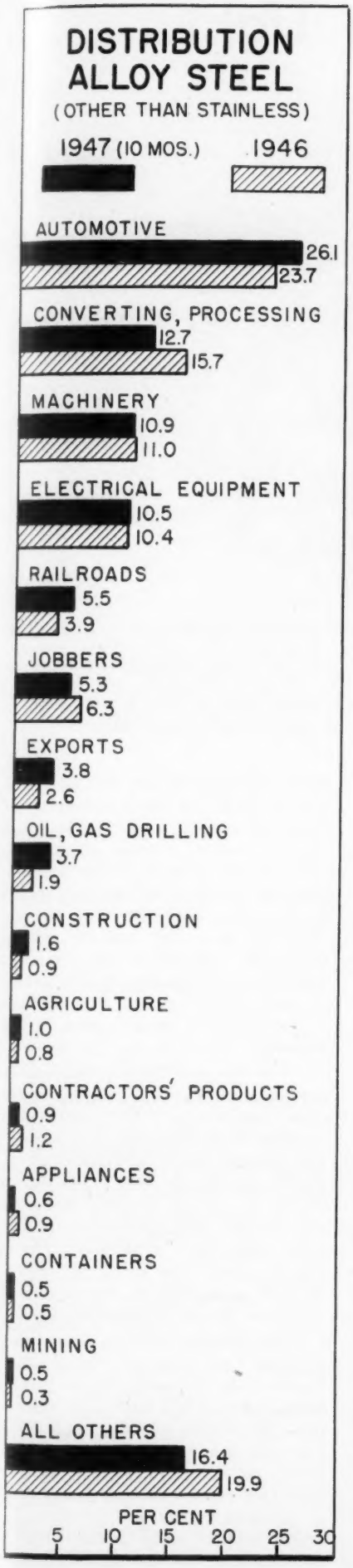
Of the finished steel net shipments both for November and for the 11-month period of last year, five products accounted for almost half of all tonnage. Percentage of their tonnage relative to total shipments was virtually unchanged between the two periods. These products—structural shapes, plates, hot-rolled carbon bars, and hot- and cold-rolled sheets—ac-

Distribution of Steel Products—October, 1947

(In net tons of leading products of all grades, including alloy and stainless)

Market Classification	Shapes	Plates	Hot-Rolled Bars	Cold-Finished Bars	Seamless Tubing	Drawn Wire	Hot-Rolled Sheets	Cold-Rolled Sheets	Coated Sheets	Hot-Rolled Strip	Cold-Rolled Strip	Total (All Products)
Converting and Processing	4,393	50,422	212,514	14,062	13,530	100,963	78,658	4,403	1,650	40,451	7,356	1,051,847
Jobbers, Dealers, Distributors	78,507	85,981	111,431	31,990	71,806	19,995	77,233	41,626	42,207	12,629	3,486	952,883
Construction, Maintenance	164,088	154,352	34,481	194	29,112	3,196	31,754	3,543	9,478	7,616	2,772	594,857
Contractors' Products	1,168	14,563	15,124	1,064	1,565	3,588	46,137	33,620	42,290	6,404	6,685	193,567
Automotive, excl. Tractors	3,079	37,167	136,725	20,069	942	20,048	215,891	238,005	8,542	51,458	29,919	793,039
Rail Transportation	44,217	92,532	39,115	597	42	334	23,771	3,296	5,614	2,772	301	436,731
Shipbuilding	4,043	19,380	2,060	298	238	27	701	148	570	21	30	28,126
Aircraft	.....	133	117	303	82	9	239	185	.....	17	213	1,924
Oil, Gas Drilling	4,277	9,323	6,300	285	34,984	32	3,590	186	46	154	.....	76,898
Mining, Quarrying, Lumbering	2,286	4,776	4,857	175	374	178	1,146	87	201	223	.....	26,154
Agricultural	4,140	9,704	51,530	7,365	123	3,411	14,687	3,766	6,142	9,571	270	118,190
Machinery, Industrial Equip., Tools	19,404	59,706	56,137	23,029	9,231	9,858	25,263	8,638	1,699	10,664	6,084	258,585
Elect. Machinery, Equip.	5,554	12,061	8,952	4,495	103	5,604	23,147	13,249	3,200	6,684	3,888	151,538
Appliances, Utensils, Cutlery	103	1,097	1,890	4,796	97	4,051	35,516	52,685	9,565	3,940	9,055	146,968
Other Domestic, Commercial Equip.	2,067	15,334	7,087	4,662	18	27,792	21,109	36,737	6,041	7,924	20,129	163,590
Containers	65	3,756	2,707	197	359	10,022	63,674	28,829	3,429	15,271	10,042	443,416
Ordnance, Other Military	67	282	2,399	201	57	34	93	130	.....	.....	121	7,873
Unclassified	19,590	2,138	51,056	11,486	14,102	46,426	24,738	4,354	2,951	4,428	39,822	380,840
Export	41,846	35,516	41,314	5,961	19,512	9,199	20,549	9,583	5,479	7,448	1,843	388,540
Total	398,894	608,223	785,796	131,229	196,277	264,767	707,896	483,070	149,104	187,675	142,016	6,215,566
* Less shipments to members of industry for conversion	166	19,115	85,976	1,455	12,499	15,613	48,747	2,805	107	30,231	2,829	533,969
Net Total	398,728	589,108	699,820	129,774	183,778	249,154	659,149	480,265	148,997	157,444	139,187	5,681,597

* All of these shipments were made to the group classified as "Converting and Processing."



counted for 46.9 per cent of net total shipments in November and for 47.0 per cent of shipments for the first 11 months.

Leading in shipments for November and for the first 11 months was hot-rolled sheets with 620,770 and 6,634,151 net tons, respectively; in second place was plates at 513,000 and 5,754,439; third was hot-rolled carbon bars at 493,961 and 5,721,443; fourth went to cold-rolled sheets at 463,543 and 4,957,847; and structural shapes was in fifth place for both periods with 353,384 and 4,056,515 net tons, respectively.

AISI To Hold General Meeting May 26-27

American Iron & Steel Institute will hold its 56th general meeting in New York on Wednesday, May 26, and Thursday, May 27. Sessions will be conducted at the Waldorf-Astoria. As in recent years, attendance will be restricted to individual members, active, associate, emeritus and honorary.

Mexico Builds New Aluminum Sheet Mill

The first aluminum sheet ever rolled with modern equipment in Mexico is now coming off a newly-completed sheet mill near Mexico City. The sheet is fabricated from Canadian ingot made at Arvida, Que.

The aluminum is the product of a new rolling mill, under construction for two years by Alumino Industria Mexicano S. A., a Mexican-controlled company whose president is Charles G. Seifert Sr. of Mexico City. In addition to the sheet mill, and a foil mill now nearing completion, plans call for an aluminum paste plant, to be ready for operation some time in 1948. The present annual capacity of the sheet, foil and paste plants is set at approximately 3 million pounds. This is expected to go a long way toward satisfying the current Mexican requirements for aluminum fabricated products and to help promote the expansion of Mexican industries.

New Financing of Kaiser Fontana Plant Rumored

Rumors as to a possible public financing of Kaiser Co. Inc.'s Fontana steel works have been increasing. Substantiation for the reports lies in the fact that First Boston Corp., an investment firm, has been surveying the property, that a substantial portion of the nearly $90 million owed to Reconstruction Finance Corp. falls due soon and that Fontana's managers want further expansion of the mill.

Butler Buys $500,000 San Francisco Bay Plant

Butler Mfg. Co., Kansas City, Mo., has purchased for $500,000 a building and equipment in Richmond, Calif., on the shore of San Francisco bay.

The plant was built in 1944 and used by Kaiser industries for ship subassemblies during the war. Butler will use the facility to manufacture steel buildings.

Steel Ingot Production Statistics

	Estimated Production—All Companies								*Calculated weekly production all companies	Number of weeks in mo.
	Open Hearth		Bessemer		Electric		Total			
1947	*Net tons	Per cent of capac.	Net tons	Per cent of capac.	*Net tons	Per cent of capac.	*Net tons	Per cent of capac.	Net tons	
Jan. ...	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
Feb. ...	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
Mar. ...	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st qtr..	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
Apr. ...	6,360,600	95.4	375,675	88.6	306,422	73.4	7,042,697	93.8	1,641,654	4.29
May ...	6,634,716	96.4	372,878	85.2	321,903	74.6	7,329,497	94.5	1,654,514	4.43
June ...	6,312,674	94.7	351,247	82.8	304,744	73.0	6,968,665	92.8	1,624,397	4.29
2nd qtr..	19,307,990	95.5	1,099,800	85.5	933,069	73.7	21,340,859	93.7	1,640,343	13.01
1st 6 mos. ..	38,297,571	95.3	2,177,701	85.2	1,808,381	71.8	42,283,653	93.4	1,634,467	25.87
July ...	6,028,707	87.8	256,125	58.6	285,322	66.3	6,570,154	84.9	1,486,460	4.42
Aug. ...	6,324,456	91.9	346,033	79.0	311,597	72.2	6,982,086	90.1	1,576,092	4.43
Sept. ...	6,147,448	92.4	334,425	79.0	306,769	73.6	6,788,642	90.6	1,586,131	4.28
3rd qtr..	18,500,611	90.7	936,583	72.2	903,688	70.7	20,340,882	88.5	1,549,191	13.13
9 mos. ..	56,798,182	93.7	3,114,284	80.8	2,712,069	71.4	62,624,535	91.8	1,605,757	39.00
*Oct. ..	6,826,543	99.2	384,272	87.8	349,520	81.0	7,560,335	97.5	1,706,622	4.43
*Nov. ..	6,538,179	98.1	360,620	85.0	334,236	80.0	7,233,035	96.3	1,686,022	4.29
†Dec. ..	6,655,019	96.9	373,367	85.5	341,210	79.3	7,369,596	95.3	1,667,329	4.42
†4th qtr.	20,019,741	98.1	1,118,259	86.1	1,024,966	80.1	22,162,966	96.4	1,686,679	13.14
†2nd 6 mos. .	38,520,352	94.4	2,054,842	79.1	1,928,654	75.4	42,503,848	92.5	1,617,961	26.27
†Total .	76,817,923	94.8	4,232,543	82.1	3,737,035	73.6	84,787,501	92.9	1,626,151	52.14

* Revised. † Preliminary figures subject to revision.

For 1947, percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of Jan. 1, 1947, as follows: Open hearth 81,010,990 net tons, bessemer 5,154,000 net tons, electric 5,076,240 net tons, total 91,241,230 net tons.

Scrap Supply To Continue Tight

Demand for 1948 expected to exceed that of 1947 when record tonnage of open market scrap was moved. Auto graveyards, war surplus and imports may help increase flow

Millions of World War II ammunition shells are being unloaded at a Pueblo, Colo., ordnance depot to be sold as scrap. They will be remelted in Pueblo steel mills. Workmen, above, make a final inspection to be positive that no explosive gets into the piles. NEA Photo

PROSPECTS are not encouraging for any substantial improvement in iron and steel scrap supply over coming months. This was the opinion of numerous dealers and brokers attending the 20th annual convention of the Institute of Scrap Iron & Steel Inc., at the Congress Hotel, Chicago, last week.

And this viewpoint was borne out in several of the formal addresses presented at the various convention sessions. For example, Norwood B. Melcher, mineral economist of the Bureau of Mines, pointed out that while consumption of purchased scrap last year reached a record-breaking total of 25,400,000 gross tons, the scrap industry this year will be called upon to provide at least 1 million tons more. He based this upon anticipated steel production of 88 million tons which will call for 26,400,000 gross tons of purchased scrap.

Mr. Melcher said that the 1948 consumption of pig iron will probably amount to about 55,700,000 gross tons, while the consumption of home scrap, representing 26 per cent of the total melt, will approximate 29 million tons. This rate of use, naturally, will place a greater responsibility on the scrap suppliers and dealers than ever before.

Sights Are Raised—In his address opening the convention, Edward L. Solomon, first vice president of the institute, who presided in the absence of the president, Philip W. Frieder, who is ill, said that the 1947 record of the scrap industry was without parallel, but nevertheless scrap collectors, dealers and brokers must set their sights still higher for this year. He took occasion to point out the various harassments which have confronted the industry, principally the earmarking of scrap, direct dealing, conversion and tie-in deals, which, while legitimate, nevertheless have evoked criticism, and he emphasized that every approach toward applying a corrective has led to one solution—increase the supply of scrap.

"If more scrap were available," he said, "steel mill and foundry top executives would cease worrying about their supplies and let the purchasing agents revert to their normal functions; government officials from the President down would cease worrying over a potential threat to national security; controls would not be in the offing; Congress would not take cognizance of our industry in any manner—we could function as we did prewar and not have to live continuously in a gold fish bowl."

The best interests of the scrap industry, he said, are coincident with the national interest. The steel and foundry industries, which are so basic, are predicated upon large-scale use of scrap. All indications are population growth in this country will rise to a level which will generate a demand for purchased scrap a few years hence which will make 1947's record year in the industry just average. Consequently, he declared, it will be up to the scrap industry to take care of this expanding demand.

More Cars To Be Scrapped—That more scrap will be needed this year also was emphasized by L. D. Greene, consultant for the American Iron & Steel Institute. He declared that what is needed to bring about additional scrap is initiative, stick-to-it-tiveness and price. In his opinion the scrap will be available in sufficient tonnage to care for all needs. Domestically, he said, exclusive of industrial production, perhaps the biggest source, outside of government, is the product of the automobile graveyards. New cars and trucks are coming off the lines at a rapid clip, he pointed out, and the rate of graveyard production, as new cars become more plentiful, will increase; in fact, this increased flow already is noticeable in some parts of the country.

"Once the country is convinced we are on a plateau of high prices for some time to come," Mr. Greene said, "industrial construction will increase and, as a corollary, demolition of obsolete structures will step up, a source amounting to little since the war started. Demilitarization of military equipment is already increasing; we still have a big backlog of ships to be broken up and even War Assets is bound to increase sales.

"From foreign sources I am hopeful that the scrap fact-finding mission now in Germany will be helpful in augmenting the flow of scrap, and don't forget that Washington is scrap conscious as never before. I saw plenty of scrap in Europe a little over two years ago, and I am firmly convinced that the greatest so-called mine of scrap in the world is in Germany. Scrap in the Pacific

also is not to be overlooked."

Stresses Preparation—The speaker devoted considerable attention to the matter of "better" scrap, pointing out that good scrap is very largely a matter of preparation. The kind of scrap shipped to the steel mills makes a lot of difference in production, and he urged the scrap men to exert the utmost effort in preparation, declaring that in doing so they will be performing a service to themselves in that they will reduce rejections to a minimum.

Delegates to the meeting were reminded by Raymond L. Collier, executive vice president, Gray Iron Founders' Society, Inc., that at some time in the not too distant future scrap will again have to compete with pig iron for the foundryman's favor. As he sees the outlook, the two most important factors are going to be (1) price and (2) good preparation and segregation. The latter will become of ever greater importance as exact metallurgical control continues to grow in the gray iron foundry industry, and he emphasized that scrap suppliers who are interested in continuing to sell to foundries can hold the business only by giving sound values.

The importance of the foundry industry as a consumer of scrap is seen in the fact that about one out of every three tons of iron and steel scrap purchased on the open market goes to gray iron foundries, according to Mr. Collier. Last year an estimated 13 million tons of gray iron castings were produced. That means that last year, when scrap shipments hit an all-time high, the gray iron foundries bought in the neighborhood of 8 million tons of scrap. Except in the case of a few specialty foundries, the industry buys its scrap in the open market.

Grading Essential—While not too critical of scrap segregation under present circumstances, Mr. Collier urged that the dealers and brokers spend as much time as necessary with their foundry customers in order to determine precisely the type, size and grades of scrap which best fit their operations. Then, he declared, do everything possible to meet these requirements, and if there is any doubt about the condition, quality or acceptability of a shipment, consult with the foundry before moving the material, since the foundryman must know that burnt iron is not mixed in with No. 1 cupola cast, or that stove plate is scattered through stripped motor blocks.

The speaker said that the found-

(*Please turn to Page* 119)

Is Base Pricing Legal?

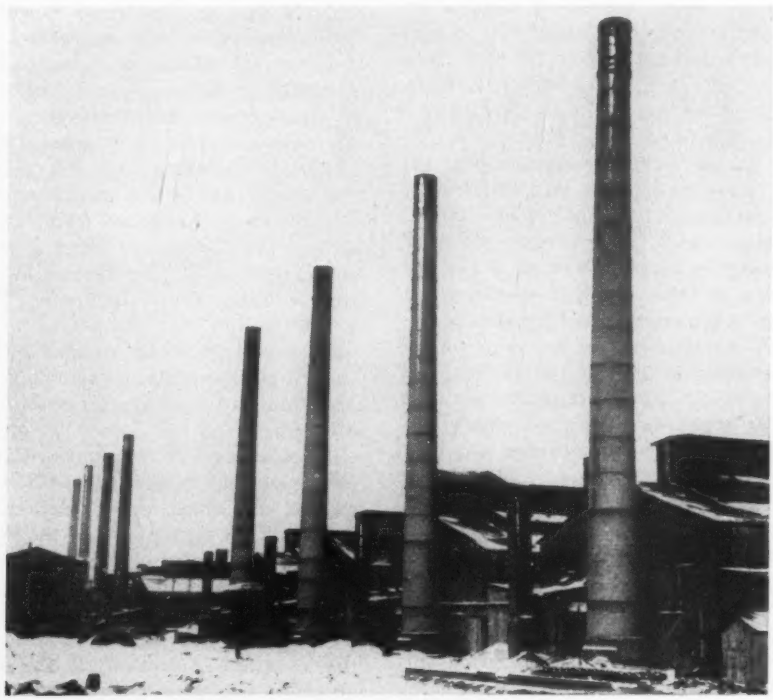
Circuit Court of Appeals asked to decide this in appeal of rigid conduit manufacturers from cease and desist order of Federal Trade Commission

LEGALITY of the basing point system of determining prices is being argued in the United States Circuit Court of Appeals in Chicago.

The case, involving an appeal by the rigid steel conduit industry from a cease and desist order of the Federal Trade Commission, is significant in that it is shorn of related charges of combination or conspiracy prohibited by the Sherman Antitrust Act or price discriminations barred by the Robinson-Patman Act. The case concerns only the legality of the basing point method per se.

Decision in the case will be far-reaching in that some of the nation's large industries, including steel and cement producers, use the basing point system, under which the cost of a product to purchasers is established as the factory price plus freight from any one of several cities or transportation centers, termed as basing points, which are not necessarily the point at which a factory is located. The FTC, which wants manufacturers to set a single f.o.b. mill price for each plant and to sell to everyone at that price, charges that the basing point method produces the same result as collusion.

Counsel for the industry maintained that the FTC is seeking to impose upon conduit makers "its own economic theory that each manufacturer should operate solely within the territory in which it has a 'natural freight advantage' and should not be allowed to compete for business in a territory in which any of its competitors have such advantage."



ZINC PLANT QUITS: Residents of Langeloth, Pa., are wondering if their village is destined to become a "ghost town" as they view the smokeless stacks of the American Zinc & Chemical Co. Victim of labor union excesses which resulted in a paralyzing 108-day strike in 1946, from which the works never recovered, the plant will be closed and dismantled. Formerly it employed 800 workers on a $9000 daily payroll. Some union members now are freely admitting that their 1946 demands "went too far," prevented the company from keeping the plant in good physical condition. More recently the union underwent a change of heart and a change in leadership, adopted a co-operative attitude, but the damage was done. NEA photo

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Moderate relaxation and clarification of rules governing exemptions from overtime provisions of Fair Labor Standards Act expected this spring

WAGE & HOUR Division, after completing its long series of hearings on the regulations governing exemptions from the overtime provisions of the Fair Labor Standards Act, has undertaken a methodical study with the intention of compiling a new bulletin. This, in view of the large amount of ground to be covered, is not expected to be available to interested parties before April or May, if then. The record that was compiled during the six weeks of hearings which ended Jan. 19 will have to have thorough study by Administrator William R. McComb and his associates; it consists of more than 4000 typewritten pages plus exhibits.

Present indications are the rules governing exemptions will be relaxed —but not to the extent desired by some employers, many of whom would like exemption for all their so-called "white collar" workers. Rather, the rules will be clarified and made more explicit. Part 541 of the regulations will be substantially rewritten—particularly subsection (F) of section 541.1, subsection (B) of section 541.2, and paragraph 4 of subsection (A) of section 541.3. All relate to the type of work which may not be performed by the executive, administrative or professional employee if he is to qualify for exemption. Numerous employers said there was room for too much uncertainty under the rules as now written.

This point was gone into in detail by S. A. McCaskey Jr., secretary, Allegheny Ludlum Steel Corp., who, after relating his troubles under these sections in establishing exemption for foremen, asked:

"Why should we be placed in the difficult position of being required to determine, at our peril, whether from time to time any foreman may have assisted his men to such an extent that he may have exceeded the 20 per cent arbitrary limitation of the present regulations?

"Our alternative," said Mr. McCaskey, "is to resolve any doubtful case in favor of nonexemption, and pay overtime premiums in cases where we sincerely believe no such premium payment was intended to be required by Congress."

Mr. McCaskey cited cases where foremen perform some operation to speed up production when the regular man for this operation may be off his job for a few minutes—as hooking up a crane lift or making clerical entries. In these cases, he said, the foremen are genuine executives, and do not replace nonexempt employees. Mr. McCaskey thought the best way of clearing away the confusion on this point would be to raise the minimum salary requirement.

"If the minimum salary requirement is raised to a rate a little more realistic in the light of present circumstances," he said, "no need really would exist for the work requirement provisions for the types of exemptions covered by part 541. The minimum salary in the three classifications—executive, administrative, and professional—should be raised to $275 a month or $60 a week. Employees in these three classifications usually are paid in excess of these amounts."

As to amending the Fair Labor Standards Act itself, that question still is up in the air on Capitol Hill. Before the McConnell Wage & Hour subcommittee of the House Education & Labor Committee will report a bill to the full committee it demands certain policy decisions from the House majority leadership. Unless majority policy prevents, Mr. McConnell and his associates on the subcommittee will recommend important changes in the act as it now stands; in which event further revisions in the regulations of the Wage & Hour administrator would be called for. The subcommittee sentiment calls for more widespread exemption to the overtime provisions, relaxation of the overtime provision in the case of office workers, clear definition of such terms as "regular pay," "bonus pay," "overtime," etc., and elevation of the minimum hourly wage, now 40 cents, to a "compromise" level—say, not higher than 65 cents.

Navy Shifts Purchasers

In accordance with Navy policy of not allowing key officers to get in a rut, an important shift has been made in the Bureau of Supplies & Accounts, Washington. Capt. R. T. Roberts now is officer in charge of the Purchase Division, succeeding Comdr. Edward F. Metzger. Captain Roberts has been serving as supply officer at the Naval Shipyard, Philadelphia, and as submarine supply officer at Philadelphia. Commander Metzger has been transferred to Port Hueneme, Calif.; where he will be Bureau of Yards & Docks supply officer at the Naval Construction Battalion Center.

Member Urges FTC Changes

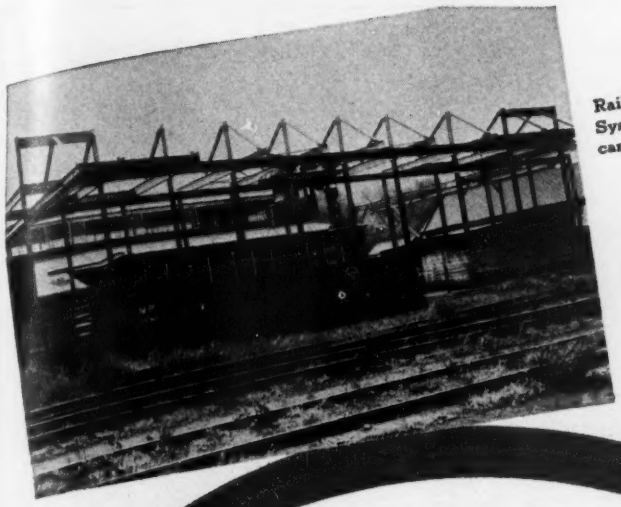
Annual report of the Federal Trade Commission just submitted to Congress is notable chiefly in showing that the rift among the commissioners as to methods of dealing with business under the antitrust laws is as deep-seated as ever. For the first time in its history the commission has filed a report containing "minority" recommendations to Congress. The minority report, inserted by Commissioner Lowell Mason, charges the commission with ineffectiveness and calls for approval of a bill which, Mr. Mason believes, would invite compliance.

This proposal (STEEL, Oct. 27, 1947, p. 54) calls for approval of a bill authorizing government officials, through adoption of a trade practice rule for an industry, to advise business men in advance of a court test that a given act was not, in their opinion, violative of the antitrust laws. The Mason bill would give to business men complete immunity from prosecution for any act or ommission to act resulting from conformity to such a rule. It would force government officials to give notice in case they changed their minds, with immunity continuing for acts done prior to receipt of such notice.

In printing its report the commission deleted Mr. Mason's statement in support of his proposals, and the latter has sent a separate report to all members of Congress. In it he explains what he considers wrong with the present setup.

"The commission spends a disproportionate amount of time on the sanction of force through hit and miss prosecutions of individual complaints and does not make sufficient effort towards a mass understanding and acceptance of the law," says Mr. Mason's report.

"Cease and desist orders issued after lengthy and costly trials may have served as deterrents in some cases, but often they only place the



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One man now unloads a car in 5 hours where formerly 3 men took 36 hours.

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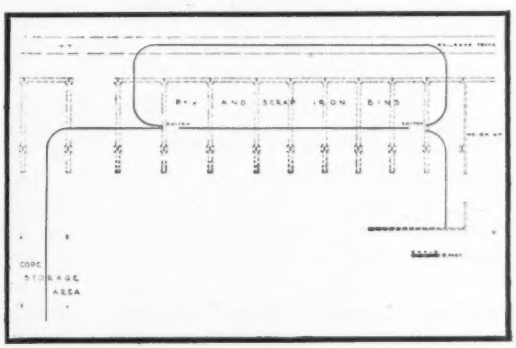

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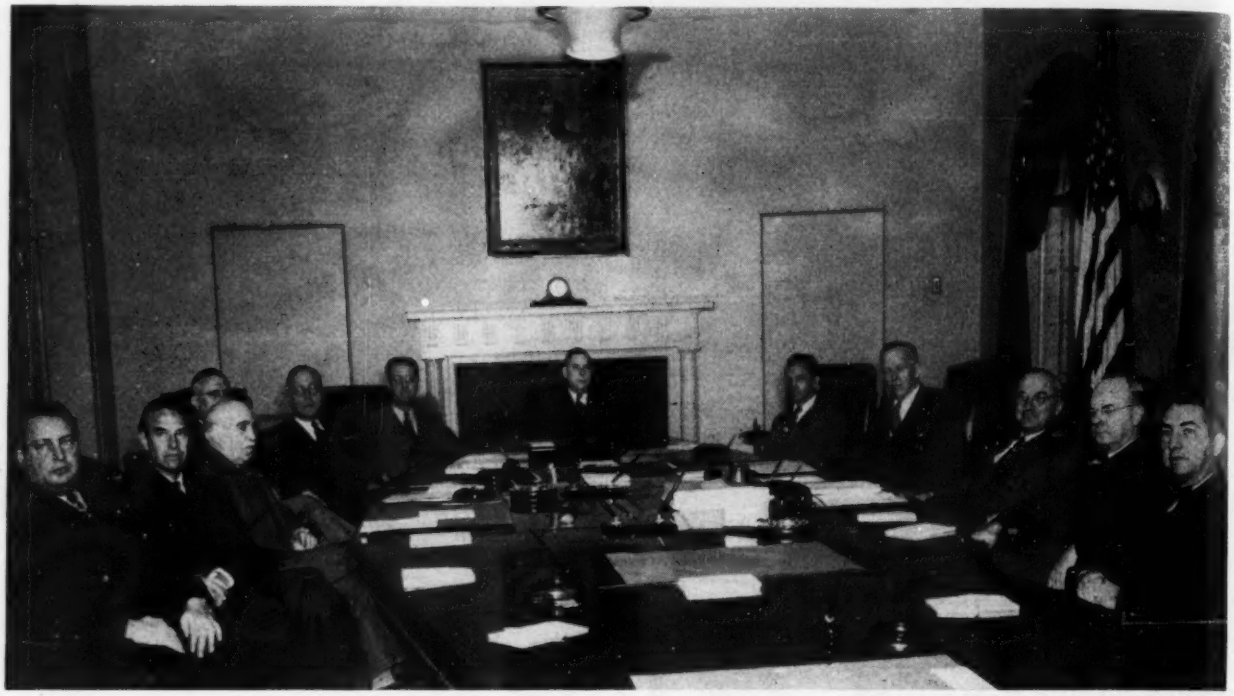


"OFFICIAL FAMILY": President Truman poses with members of his cabinet in the cabinet room of the White House. Left to right: Secretary of Interior Julius A. Krug; Secretary of Commerce W. Averell Harriman; Maj. Gen. Philip B. Fleming, Federal Works Administrator; John R. Steelman, assistant to the President; Secretary of Labor Lewis B. Schwellenbach; Secretary of Agriculture Clinton P. Anderson; Postmaster General Jesse M. Donaldson; Secretary of Defense James V. Forrestal; Secretary of State George C. Marshall; President Truman; Secretary of Treasury John W. Snyder; and Attorney General Tom Clark. NEA photo

respondent under a handicap not imposed on his competitors. In addition, looking at it from the consumers' point of view, a cease and desist order entered against one company rarely results in protection to the public if the banned practice is common to others in the same business. The failure in all punitive procedures is that they attack individual symptoms without removing the general causes."

Munitions Board Expanded

Several major steps have been taken to improve the effectiveness of the National Military Establishment, according to announcement by Secretary of Defense Forrestal. Most important is creation of a "monitor" for military mobilization needs in the Munitions Board. Known as the Requirements Division, it is to review all estimates for military equipment, supplies, raw materials and manpower sent in by the Joint Chiefs of Staff, Army, Navy and Air Force, as well as by other divisions of the Munitions Board. It also will prepare reports on production necessary to support strategic military plans and will resolve conflicting priority demands of the three services.

Another addition to the Munitions Board, the Foreign Trade Section, will look into matters of military interest in foreign trade.

The Munitions Board has asked the three military departments to nominate members of an Ad Hoc Committee to study immediate and long-range needs of the National Military Establishment for steel, oil and other scarce materials.

The Munitions Board also has begun a study of eventual total requirements of the National Military Establishment for manpower, transportation, communication, etc.

The Committee on Basic Physical Sciences, of which Dr. W. V. Houston, president, Rice Institute, is chairman, is organizing an investigation of the research programs of the three services in fluid dynamics, physics, metallurgy, chemistry and materials, with special attention to insuring adequate research, without duplication, in the search for materials that will withstand the high temperatures encountered in jet engines, in the propulsion of guided missiles, etc.

Seaway Bill in Offing

The Senate is scheduled to call up the St. Lawrence seaway bill this week. The new bill, S. J. Res. 111, contains a provision to make the seaway self-liquidating through the collection of toll charges not to exceed $1.25 per 2000 pounds of laden cargo (for navigation of the proposed new deepwater channel in the St. Lawrence) "with the exception of local or way or government traffic as may be agreed upon."

In the House, the Public Works Committee tentatively had scheduled further hearings on the seaway project to begin Jan. 26, but Chairman George A. Dondero (Rep., Mich.) now has ruled that no House action will be taken until the Senate has acted.

Collect Foreign Technical Data

The State Department will collect information on foreign developments in science and technology and make it available to American private business. The first move is organization of a Mission on Science and Technology to be established in the United States Embassy in London. Findings of interest to industry will be disseminated to United States manufacturers by the Commerce Department's Office of Technical Services.

Head of the new mission is Dr. Earl A. Evans Jr., chairman, Department of Biochemistry, University of Chicago.

British Up Some Steel Quotas

Larger allocations promised key industries at expense of shipbuilding, construction. Steel output in 1947 exceeds 12.5 million target. Raw materials are stumbling block

BIRMINGHAM, ENG.

CERTAIN vital British industries will be assured of improved steel supply under the allocations announced by Sir Stafford Cripps, chancellor of the exchequer, recently. To benefit from the increases will be the engineering, automotive, coal mining machinery and electric power generating industries.

Since the additional amount of steel allocated for these purposes is larger than the expected increase in steel production this year, however, other less essential industries will suffer. Factory and government building will obtain about two-fifths less steel this year than last, and the shipbuilding industry will get about four-fifths of its 1947 total.

The reduction in steel deliveries to shipbuilders will not affect the shipbuilding program, according to Sir Stafford, but Sir Frederick Rebbeck, chairman of the shipbuilding firm of Harland & Wolffs, Belfast, describes the reduction as extremely serious for the industry. He says this cut may result in 20 per cent lower employment among the yards at a time when they are filled with export orders.

Distribution Reform Planned—Active steps are being taken to revise the whole scheme of distribution of supplies and the Ministry of Supply has asked for a nation-wide census of receipts and consumption of steel during the fourth quarter of last year and for the total stocks on hand as of Dec. 31. It is believed the result will be of great assistance in insuring equitable distribution of further supplies.

The problem of obtaining sufficient scrap to maintain the current rate of steel production is of major concern currently. Rerollers are also in difficulty regarding supplies of semifinished steel. With very little material being imported, these plants are not receiving enough small billets and sheet bars to operate at capacity.

Price Increases Forecast — Some pronouncement on steel prices is expected in the near future. Costs of production have mounted since the beginning of the year by virtue of higher coal prices and an increase in electric power rates. A general increase in steel prices seems certain.

Owing to the urgent needs of the steel industry for more basic iron, it has been necessary to transfer two furnaces making foundry grades to basic. This move has swept away any hope the foundry trade had of a larger supply of iron for production of light castings. Although house building has been curtailed, there is still a big call for these products both for home and export markets. Pig iron production generally is running at a higher rate than for many years, however.

Year's Target Met—Steel production reached its target of 12.5 million tons for 1947, when in the 52-week period ended Dec. 27, 12,515,000 tons had been produced. Quarterly figures, detailed in the accompanying table, show how fuel difficulties, in the first part of the year particularly, held down output. During the second part of the year, however, output exceeded the previous year's rate considerably and in the fourth quarter the annual rate was in excess of the 13.5 million ton target rate asked by the Prime Minister last fall.

Raw materials were not being supplied in the fourth quarter at a rate sufficient to maintain that quarter's level of output, and its achievement was made possible only by drawing against inventories.

Pig iron output increased throughout the year as more coke became available. Even in the fourth quarter, however, the coke shortage limited production to a rate of 8.5 million tons, compared with a requirement of over 9 million tons needed to maintain steel output at 14 million ingot tons. Better supplies of coke and scrap have started to come forward and if they can be kept up, the 14 million ton rate should be achieved this year.

German Plant Removals, Deconcentration Continue

Continuing the deconcentration program, three new independent steel companies have been created in Germany. These are: Stahlwerk Osnabrueck AG, taking over the Osnabrueck steel plants of Kloeckner; Eisenwerk Schalke AG in Gelsenkirchen, taking over the Schalke steel plant of the German Steel Trust in that city; and Stahl & Walzwerke Grossenbaum AG, taking over the Duisburg mill of Mannesmann.

The independent companies which have been created so far continue to operate at a loss and it is thought the long-pending price increase of 22 marks per ton on iron and steel will be granted. If allowed, however, this advance will not be sufficient, it is believed, to enable the split-up plants to show profits.

Meanwhile, plant dismantlings are still under way, with steel plant removals, particularly, requiring a tremendous amount of manpower, materials and transport. As an example, dismantling of the Borbeck steel plants, regarded as among Europe's most modern facilities, was begun in February, 1946, with 28,000 men engaged in the operation. To date about 50,000 tons of equipment have been shipped and the dismantling procedure on the mill buildings proper will not begin until 1950.

BRITISH STEEL, PIG IRON PRODUCTION

(British Iron & Steel Federation)

STEEL INGOTS AND CASTINGS

(Tons)

	1947		1946	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
November	272,600	14,174,000	263,800	13,715,000
December	243,200	12,646,000	236,300	12,289,000
1st Quarter	216,000	11,231,000	242,600	12,617,000
2nd Quarter	244,100	12,694,000	252,100	13,111,000
3rd Quarter	235,400	12,241,000	230,000	11,953,000
4th Quarter	263,100	13,679,000	251,700	13,088,000
Year		12,724,000		12,693,000

PIG IRON

(Tons)

	1947		1946	
	Weekly Average	Annual Rate	Weekly Average	Annual Rate
November	165,900	8,617,000	153,900	8,002,000
December	164,600	8,561,000	153,200	7,966,000
1st Quarter	134,400	6,989,000	145,000	7,566,000
2nd Quarter	141,600	7,363,000	150,500	7,827,000
3rd Quarter	146,700	7,628,000	146,600	7,622,000
4th Quarter	163,600	8,505,000	154,400	8,029,000
Year		7,785,000		7,761,000

SPECIAL MACHINERY

Output Accelerating

Builders, stimulated to precedent-shattering volume by strong consumer demand for end-products of machines, anticipate further production gains despite materials shortages

By HOWARD C. TUTTLE
Assistant Editor, STEEL

HAMSTRUNG though they are by shortages of raw materials and components, builders of special machinery are now producing in greater volume than ever before in peacetime.

Output has climbed prodigiously since the war ended, and last year's turn-out by some manufacturers was more than 1000 per cent greater than in the immediate prewar period. This upward trend should continue throughout most of this year, the builders indicate, unless reinstatement of allocations of certain critically short materials, particularly steel, crimps operations.

The manufacturers, building machinery for the food processing, packaging and baking industries, textile producers, pulp and paper mills, commercial laundry and dry cleaning establishments, woodworking shops and basement carpenters, the oil refining industry, and printers and publishing houses, predicate their outlook for improved performance this year on the still-unsatiated demand for the varied products made with their machines.

Demand for these end-products stems from as many reasons as the products made on the machines. Fundamental, of course, is the greater buying power of the consuming public—more money for clothes, food, reading matter, recreation—and in general a higher standard of living. More leisure time is another important factor in the rise in demand for some products made with these machines. Pent-up needs of these products' manufacturers for new equipment, which in many cases was unobtainable throughout the war, also figures in providing the builders with their cheery business outlook.

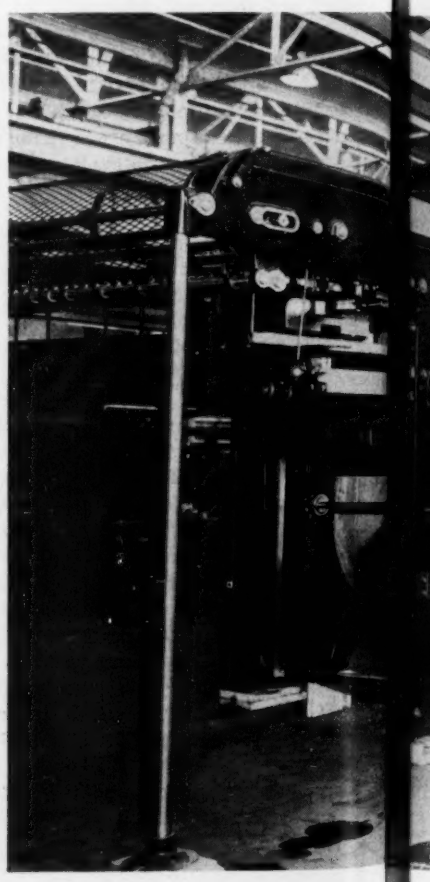
Materials Big Problem — As with nearly all other durable goods producers, the manufacturers have weathered a multiplicity of problems in the last several years. Depending upon the essentiality of their machines to the war effort, their reconversion problems and postwar planning took somewhat different directions—some of the companies, for example, expanded their capacity tremendously during the war, while others marked time, waiting until the scope of the peacetime economy could be gaged and plans projected accordingly. By 1947 industries' problems had centered around materials supply, to a great extent arising out of the strike disruptions of 1946. These shortages were most crucial in steel, motors and other electrical equipment, bearings and ferrous castings. To keep production high despite these shortages a decided effort to subcontract parts was made.

Beyond the general conclusions that builders of specialized machinery (1) found production in 1947 somewhat higher than in 1946 and vastly beyond that of prewar, (2) were confronted with similar materials shortages, and (3) are confident of some further output gains in 1948, their performance, problems and prospects vary widely. For this reason the industries will be considered separately.

Woodworking — The boom in woodworking machinery demand has been stimulated in three ways: First, a multitude of tools are needed by the lumbering and construction industries with the upswing in home building; second, many new homes, being completely outfitted with new furniture, are giving rise to increased demand from furniture manufacturers; and third, home craftsmen, using woodworking tools either for fun or profit, are a fertile sales field for small power-operated saws, sanders, lathes, drill presses and other light machines. This latter group last year was estimated as providing a record $50 million market.

At the present time some 200 to 300 firms are making tools for the nation's estimated 850,000 home workshops. Now high incomes and pent-up demand keep these firms producing in volume; competition which is expected to set in increasingly during this year, however, will require broader distribution, widened product lines, and consequent increased capital investment, with many of the newcomers to the field expected to pass from the picture. Well established companies, producing a variety of woodworking machinery, however, see an extremely rosy future ahead.

Porter-Cable Machine Co., Syracuse, N. Y., for example, says its order backlogs for the vast majority of its products "seem to be increasing in spite of greatly increased production." This company's output in 1947 was es-



timated as about 35 per cent above that for 1946; 1948 production is expected to be up at least 25 per cent over 1947.

Although at Delta Mfg. Division, Milwaukee, Rockwell Mfg. Co., production during 1947 was prevented from reaching its peak by shortages of certain essentials, such as steel and small motors, the year was a banner one for light power tools, but a supply-demand balance has not yet been struck. When this point will come is, of course, conjectural throughout the industry, but a leveling off of demand is looked for toward the end of this year.

Food Processing, Packaging — Having seen unprecedented food consumption during the war years and since, this machinery producing industry, which makes such items as baking, canning, grinding and mixing and cooking equipment, now reports demand for its products is leveling off and in general order backlogs are contracting. In relation to prewar, volume of this equipment currently being produced is up to five times greater. Production during 1946 had been seriously hampered by strikes, some of six months' duration, and output was handicapped considerably in 1947 by lack of sufficient steel, motors and castings. Inadequate supplies of other components, such as chain drives, etc., also prevented output from satisfying the food producing industries' wants. Labor supply has been a pressing problem in various sections of the country and labor's productivity is regarded by some companies as having dropped as much as 30 per cent. In general the machinery builders feel their plant capacities are large enough to meet all demands, but stress that their ability to produce in sufficient quantities depends almost entirely upon availability of materials.

Laundry, Dry Cleaning—Builders of specialized machinery for laundries and dry cleaners saw production last year attain a volume double that for any prewar year and increase slightly over 1946. The rate of output maintained by the industry last year will hold about unchanged this year, with some progress being made against the large order backlog that had been built up during the war. Preventing shipments from matching current and accumulated demand during the last year were those shortages common to all machinery manufacturers.

Pulp, Paper — Demands upon machinery builders by the pulp and paper mills are on the increase, even though production of this equipment is well above the prewar level. Allis-Chalmers Mfg. Co., Milwaukee, through intensification of its sales efforts in the paper-producing field, stated its 1946 orders were more than ten times greater than the yearly average for the four years immediately preceding the war. Sales in 1947 were estimated at about 40 per cent above those for 1946. Samuel M. Langston Co., Camden, N. J., reports its order backlog, which now extends two years, is holding steady, despite a production rate about 50 per cent higher than in 1946.

Printing — Machinery for the graphic arts industry is being produced at a rate about twice that of prewar, with the builders now shipping approximately $220 million worth annually. This flood of equipment, however, is not enough to satisfy the needs of the country's lithographers, printers and publishing houses. The graphic arts machinery industry had its normal peacetime manufacturing lines almost completely blocked out during the war, its production given over to heavy ordnance. Total reconversion by the industry after the war took about 20 months because of the complexity of the machines manufactured—some having as many as 2500 parts, and each machine requiring as many as 10,000 machining operations. In view of these factors and the unusually long manufacturing cycle running from six to nine months on the larger printing presses, partial relief from the machinery famine is only now beginning to be felt. Production, furthermore, has been hampered by shortages, both of labor and materials, lower labor productivity, and higher rate of rejects. All companies report extreme difficulty in buying castings, one stating its expediters are now buying from 27 different foundries as compared with two in prewar. To help alleviate this shortage and to expand its capacity, at least one company, Goss Printing Press Co., Chicago, has acquired another printing press builder and in so doing added a captive foundry.

Oil Refining — Producers of petroleum machinery, generally, forecast a slight easing in demand for their equipment this year. During 1947 it was noted that backlogs were contracting and that capacity and ability to produce were more than sufficient to meet demand. Machinery during the year was not critically short the way tubular products were in the oil industry. Labor turnover was high through-

(*Please turn to Page* 119)

Outstanding showing in the metalworking field is being made by builders of special machinery. Symbolizing the size and complexity of the industry, this huge four-color printing press requires a nine-month manufacturing cycle

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At a time when America must make fullest use of its steel-producing capacities and conserve its natural resources, the trend to N-A-X HIGH-TENSILE has national significance. Each ton produced represents a potential 33% increase in finished goods. Each ton used enables the manufacturer to get 33% greater usefulness out of his steel supply.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Public favors smaller, lighter cars, but builders doubt that lowering weight will permit lowering costs. Generally agree design would have to start from scratch

DETROIT

AN ADVERTISING MAN these days will make a survey at the drop of a hat, with virtually no limit on the questions to be answered or opinions to be obtained by the recently involved techniques of "scientific sampling," "spot checking," "cross section analysis" and the like. One of the latest opinion polls in the automotive field is the survey conducted during December by E. R. Grace of Grant Advertising Inc. here, seeking to determine the opinions of engineers, bankers and the public in general on the desirability of a small, light car (STEEL, Jan. 19, p. 43).

His checks appeared to prove beyond doubt the majority of the public wants such a car, but among engineers there was considerable reticence over its feasibility. The cost angle of course is paramount in consideration of this type of vehicle, and while many uninformed persons assume that as weight is lowered cost is reduced, this is actually not the case. One engineer told the survey-takers the final result in eliminating 1000 pounds of weight from a car would be to increase cost from 35 to 50 per cent. And he added that while there might be a reduction in weight for a car of equal size through the use of lighter materials, experience demonstrates it would require six to eight years of lowered operating costs to make up the difference in the initial cost.

Another engineer, who looked on the light-car question more enthusiastically, drew up a set of general specifications which he felt could be achieved, to permit a retail price $300 less than present lowest-priced cars, or from $1400 to $1100. He suggested a wheelbase of 103 inches with engine in front, 114 inches if engine in rear, 63-inch front and 56-inch rear tread with engine forward, 53-inch front and 60-inch rear with engine at the rear, 350-pound engine weight, without transmission and clutch, 2200-pound curb weight, 60-horsepower engine with five-passenger seating, 6¾-inch minimum road clearance loaded, 25 per cent lower maintenance and operating cost, and five-year life.

Industry Unimpressed—Convincing as these survey figures may seem, the automotive industry generally is unimpressed at the moment. At least two light-car projects have been abandoned as impossible within cost limitations. There is a definite trend toward weight reduction in several of the 1949 models now in the tooling stage; on the other hand, curb weights are going up in some of the 1948 models, what with a little more sheet metal here and there, added weight of automatic transmissions, etc.

Chevrolet engineers discovered two years ago that to do a real job on cutting cost and reducing weight, it is necessary to start from scratch and redesign from the wheels up. They were well along with such a model and had spent upward of $15 million on the project, when the General Motors finance committtee tossed it out the window.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1947	1946
January	366,205	109,910
February	393,636	101,637
March	443,588	134,071
April	445,137	229,867
May	404,191	263,445
June	421,466	217,943
July	400,944	315,963
August	364,478	358,457
September	444,501	339,774
October	461,536	406,561
November	419,342	389,645
December	483,639*	393,223
12 mos.	5,048,663*	3,260,496

* Preliminary.

Estimates for week ended:

	1948	1947
Jan. 3	65,573	53,437
Jan. 10	111,278	64,828
Jan. 17	108,178	75,166
Jan. 24	110,000	93,278

Estimates by Ward's Automotive Reports

Pontiac Expansion Reviewed

Comprehensive expansion program of the Pontiac Motor Division, under way for the past two years, has been fairly well completed, and the results were reviewed last week in a press conference with Harry J. Klinger, general manager. This is one division of GM which went ahead with a 50 per cent expansion (Buick is another) from the 1941 capacity—a figure which subsequently proved to be a little optimistic in the opinion of many top GM executives. At any rate, Pontiac can now build 500,000 cars a year if sufficient steel, pig iron, scrap and other materials in short supply could be rounded up. However, the company must be content with its proportionate share of such items, as against other GM Divisions, and it is zealously making sure that such a share is forthcoming.

Peak year for Pontiac was in 1941 when 330,016 units were built. Last year's total exceeded 230,000 and the best that is being hoped for this year is a 10 per cent improvement to around 255,000. That is a long way from the 500,000 capacity and there are doubts the half-million figure ever will be realized, for sooner or later motor car sales are going to soften, and while Pontiac's order backlogs currently add up to 511,000, no one knows for sure just how many of these will wash out when their turn comes for delivery. Mr. Klinger estimates that if the cars could be delivered within 90 days, 95 per cent of the orders would stick. That seems highly optimistic.

Other than some additional cupola construction in the foundry, the bulk of Pontiac's plant extension is functioning, with 1,134,000 square feet added to manufacturing space which is now better than 5 million feet. New overhead conveyor lines 4 miles in length have been added to the materials handling system, making a plant-wide total of 6½ miles. Foundry output has been boosted 50 per cent to raise melting capacity to 1200 tons daily. An addition of 440 feet has been made to the motor plant to raise capacity from 70 to 100 motors per hour (incidentally 8-cylinder engines now account for 45 per cent of total production.)

A new axle plant has been equipped for production of 175 differentials per hour, handling requirements of some other GM Divisions as well. Other changes include enlargement of the assembly plant, new and larger heat treating department, additions to

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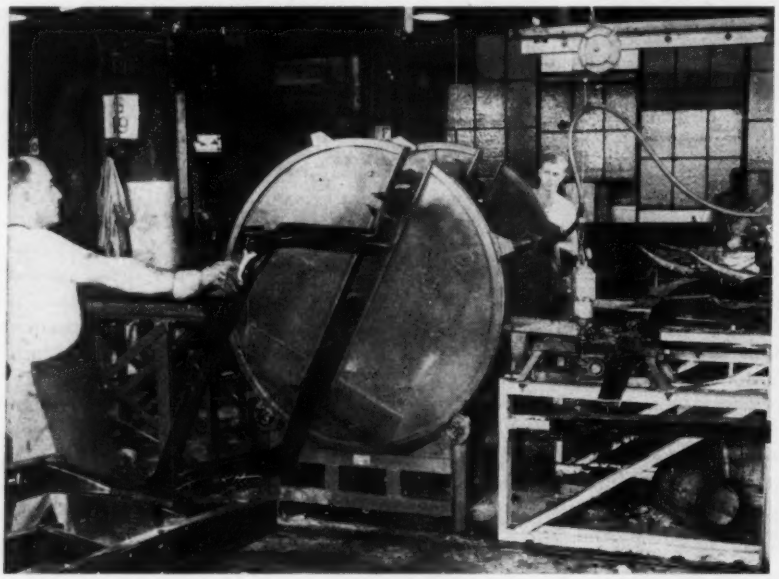


STUDEBAKER TURNOVER DEVICE: A Studebaker-developed turnover fixture has eliminated the former hoist and sling method of turning an automobile frame in the circumscribed space of the assembly line. It consists of a slotted drum which turns on four ball-bearings supported on a welded base. Two workmen push the frame into the slots, then spin the drum through 180 degrees. The operation comes between frame boring and the attachment of springs, axles, etc.

sheet metal plant and a new car shipping and storage section.

Pontiac's production scheduling problem this year has been complicated by the introduction of the Hydra-matic drive as optional equipment ($150 extra). On models equipped with this transmission, changes in frame construction are required, as well as a different floor panel stamping. The latter are of course installed in bodies which are built in a separate and adjoining Fisher Body plant, but chassis incorporating the frame revisions are sandwiched right in with the conventional types. This means a trick job of co-ordinating the flow of frames, bodies and transmissions to the final assembly line so that the proper units come together at the proper place. Reason for not changing over the entire line so the transmission could either be installed or left out of any chassis was one of cost, primarily.

Formal announcement of the 1948 Pontiac models will not be made until next week, although production started Jan. 15. Changes being only moderate, it was possible to move the first of the 1948 models down the line bumper-to-bumper with the last of the 1947 models. Pontiac officials take great pride in this achievement and claim it is the first time in the history of the industry such a feat was ever accomplished.

Appearancewise the Pontiac has moved in the direction of the current Cadillac, reflecting what seems to be a General Motors policy of "graduating" its models from year to year. Thus the Chevrolet keeps moving toward Pontiac and the latter moves on up toward Cadillac, while Cadillac steps out into an entirely new concept. This has reference primarily to such things as radiator grilles, fender moldings and overall decorative treatments. Basic body designs are unchanged for 1948 and it will probably be close to the end of the year before the completely new bodies for Chevrolet-Pontiac-Olds lines are ready for production.

Lincoln Changing Over

Changeover to 1949 models was under way last week in the Lincoln plant of Ford Motor Co. where production was halted except for Continental models. Most employees were transferred to the work of revamping the plant for the next series of cars which will be completely new from bumper to bumper. Unofficial estimates place the down time at 30-45 days because of the extent of plant changes involved, many of which have been in process for the past six months. A new motor line, for example, was installed without interrupting current production. The Lincoln engine for 1949 will be a V-8 of around 145-horsepower, and it is understood the engine offered in the largest Ford truck models, announced a week ago, is the Lincoln engine.

Stamping Work Realigned

In respect to new passenger car models, there has been a considerable realignment of body stamping work. As mentioned some weeks ago in these pages, Ford has transferred most new stampings from the Budd Co. in Philadelphia to Murray Corp. in Detroit. Meanwhile, Budd reportedly has taken on a large chunk of body production for Chrysler Divisions, formerly furnished by Briggs Mfg. Co. It is not yet clear whether Budd will ship only stampings to Detroit for assembly and finishing by Briggs, or whether the contract involves completely trimmed bodies. The latter would seem to involve an enormous freight charge, when stacked against the present practice of trucking bodies from Briggs plants to Chrysler's final assembly lines. In addition, it is doubtful if Budd in Philadelphia has sufficient facilities to handle the production of finished bodies for any appreciable share of Chrysler production. Plymouth, for example, will schedule assemblies of, say, 2000 units daily, while Dodge has been running better than 1000 passenger cars daily.

In any event, Budd is understood to have acquired a substantial amount of Chrysler business for 1949 models, in addition to making about 100 per cent of Studebaker's passenger car bodies, and a considerable volume of Kaiser-Frazer body components, the latter also being new business. Stampings for Chevrolet trucks are another phase of Budd automotive activity.

High Cost of Doing Business

In a recent New York address, Henry Ford II declared that on the basis of producing the same number of cars and trucks annually, the cost of doing business on Dec. 1, 1947, was $100 million more than it was on Dec. 1, 1946. Figuring roughly on the production of 1,000,000 cars and trucks annually, this means a unit cost increase of $100. Ford is still earning a slight profit—the "minimum we consider necessary to provide the funds we need to stay in business."

In view of steadily increasing costs all along the line, and considering the likelihood of union demands for a 25-cent hourly wage increase this spring, a further advance in automobile prices seems assured.

Human Error ELIMINATED FROM INSPECTION AND COST MATERIALLY REDUCED!

Manual inspection of piston rings is not only tedious and costly but its effectiveness depends to a great extent on the skill of the inspector. However, unless the inspection is accurate and every ring falls within tolerance limits, either the assembly of the motor or its performance is jeopardized.

Sheffield has eliminated these obstacles by developing equipment for both users and manufacturers according to their individual needs.

Typical is the automatic gaging machine shown in Figure 1 now being used in a large automotive plant which inspects and classifies 2400 piston rings per hour on the basis of gap width (to a tolerance of .007") and ring thickness (to a tolerance of .0005"). Classifications are:

1 *rejects for oversize gap*
2 *rejects for undersize gap*
3 *rejects for oversize thickness*
4 *rejects for undersize thickness*
5 *acceptable gap and thickness*

All the operator has to do is to feed the machine and remove the inspected rings from each classification chute.

The automatic unit in Figure 2, which serves an aircraft engine manufacturer, automatically inspects both gap and periphery of piston rings and segregates them accordingly.

The manually loaded electronic Piston Ring Inspector (Figure 3) also checks both periphery and gap at a speed of less than 5 seconds per ring.

If you have mass inspection operations where dimensional tolerances are critical, *chek with Sheffield* on automatic equipment to reduce costs and increase the effectiveness of inspection.

the *Sheffield* corporation

Dayton 1, Ohio U. S. A.

Sheffield MASTER CRAFTSMEN

{ Standard Gages Shipped in 24 Hours }

Steel Users in Canada Facing Tighter Supply

UNCERTAINTY regarding the new Canadian import restrictions on U. S. products and tight domestic supplies add up to a gloomy picture for many Canadian users of iron and steel. Canadian mill quotas to consumers and warehouses have been reduced for the current quarter and may continue at their present low until the middle of the year.

In the overall supply situation, some optimism is based on the hope that new rolling units will soon be in operation at Steel Co. of Canada Ltd., Hamilton, but even this is mitigated by the expectation that the company will have difficulty in obtaining sufficient raw steel to feed all the new units. Suppliers in general are not accepting orders except at the price prevailing at the time of shipment, and scheduled shipments cannot be guaranteed. Unsettled conditions in labor are further contributing to the difficulties.

Sheets Are Tight — Steel sheets, black and galvanized, are particularly tight and show no indications of improving this year. Scarcity here is having serious effects on many Canadian manufacturing operations. Steel plates are also very tight and quota cuts are reducing mill output for the current quarter by almost 50 per cent.

While carbon bars continue in short supply, cold-rolled and alloy bars have eased. Heavy structural shapes have been moving fairly well, but import restrictions are expected to eliminate this bright spot early in February. No improvement is indicated for wire and nails, and both these lines are in seriously short supply.

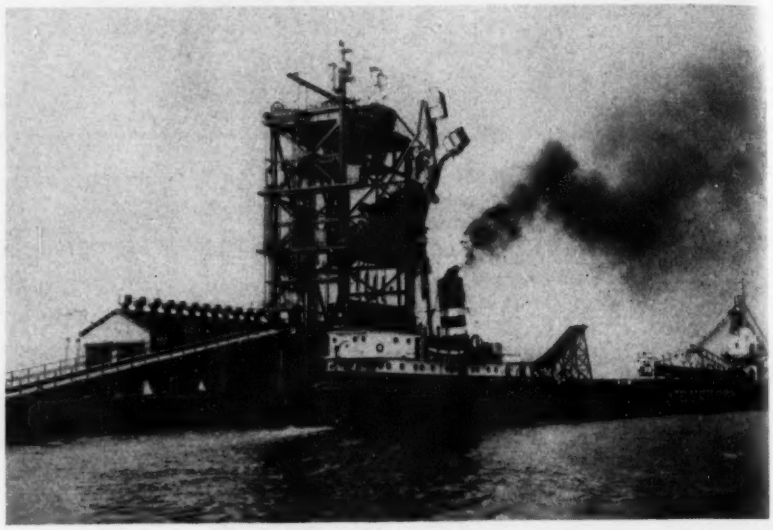
No Improvement in Scrap — Consumers are experiencing considerable difficulty in obtaining sufficient steelmaking scrap to meet requirements, and most mills are forced to depend on day-to-day supplies from domestic sources. Normally Canadian users depend on import sources for 75 per cent of their scrap needs.

Despite the fact that pig iron production is standing above the average rate for 1947, output is still insufficient. Currently 11 blast furnaces are blowing, and output is averaging about 78 per cent of total capacity.

Pig iron output during November attained the highest monthly record since last January, while steel ingot and castings showed little change in production figures from the month immediately preceding.

Following are comparative production figures in net tons:

	Steel ingots, castings	Pig Iron	Ferro-alloys
November, 1947..	255,372	174,147	11,551
October, 1947....	256,461	163,335	14,691
November, 1946..	222,644	135,269	9,370
11 Mos. 1947 ...	2,695,397	1,804,296	138,944
11 Mos. 1946 ...	2,097,331	1,242,294	105,229
11 Mos. 1945 ...	2,662,042	1,642,733	171,522



NEW COAL DOCK: A $4 million coal dock at Lorain, O., is tested by loading a lake vessel. Recently completed, the dock will be open for the Great Lakes shipping season next spring. Facility features electrically-operated coal dumper capable of picking up and dumping a 70-ton loaded coal car, then returning it to the tracks. NEA Photo

Niles Rolling Mill Plans $350,000 Expansion

A $350,000 expansion program for Niles Rolling Mill Co., Niles, O., has been announced by James A. Roemer, president. The company is a subsidiary of Sharon Steel Corp.

This sum is in addition to $354,000 spent last year to boost the plant's steel rolling capacity to 125,000 tons yearly. Included in the program will be an addition to house a bar mill. Work on the project will begin in a few months and should be finished within six months if equipment is delivered promptly. The project will not increase capacity, but will help provide alternate equipment to maintain operations.

AFA Names Six to Gray Iron Committee

Appointment of six technologists to the gray iron gating and risering committee of American Foundrymen's Association, Chicago, has been announced.

Norman A. Birch, metallurgist with American Brake Shoe Co., Mahwah, N. J., heads the group, a section of AFA's gray iron division. Those named to the committee include Graham Hassard, superintendent of foundries with Farrel-Birmingham Co., Ansonia, Conn.; T. C. Jester, metallurgist, Darling Valve & Mfg. Co., Williamsport, Pa.; William T. Haher, metallurgist, Barnett Foundry & Machine Co., Irvington, N. J.; Charles W. Mooney, superintendent of Olney Foundry Division of Link-Belt Co., Philadelphia; Prof. Howard F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass.; and A. S. Wright, metallurgist, Standard Foundry Co., Worcester, Mass.

Nichols Changes Name to Nichols Wire & Aluminum

Nichols Wire & Steel Co., Davenport, Iowa, has changed its name to Nichols Wire & Aluminum Co. to describe more accurately the firm's business.

Approximately two years ago, largely because of the shortage of steel, Nichols switched to aluminum, at first primarily on a substitution basis. The company reports that its experience is that aluminum is not a substitute and that it will stick to this metal even when the steel supply is normal.

Among the products the company manufactures are aluminum telephone and telegraph wire, aluminum barbed wire and other fence products and aluminum screen cloth.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Camcar Products Co., Rockford, Ill., manufacturer of screw products, has completed a new $200,000 plant. High speed, cold upsetting and threading machinery was installed at an additional cost of $500,000.

—o—

Columbus Bolt & Forging Co., Columbus, O., has been newly formed to take over the activities of Columbus Bolt Works Co. Organized by executives of the old Columbus firm, the company is headed by Robert M. Rex, president and general manager.

—o—

Hobart Brothers Co., Troy, O., maker of welding equipment, accessories and electrodes, has appointed Pioneer Welding Equipment Co., Sioux City, Iowa, as its distributor for northwest Iowa, northeast Nebraska and southwest South Dakota.

—o—

Brainard Steel Co., Warren, O., is the new name under which the firm will operate as a separate entity and subsidiary of Sharon Steel Corp. Sharon purchased the former Brainard Steel Corp. in 1946.

—o—

J. I. Case Co., Racine, Wis., has purchased Kilby Steel Co., Anniston, Ala. Kilby has been producing specialties for Case for some time.

—o—

Stone & Webster Inc., Boston, has acquired E. B. Badger & Sons Co., Boston, for the purpose of expanding the engineering and construction activities of its subsidiary, Stone & Webster Engineering Corp., in processing and industrial fields.

—o—

Hewitt Rubber Division, Hewitt-Robins Inc., Buffalo, has named Monarch Electrical Co., LaSalle, Ill., as a distributor within a radius of 75 miles of LaSalle for industrial hose, conveyor and transmission belting and packing.

—o—

Vapor Car Heating Co. Inc., Chicago, has changed its name to Vapor Heating Co. in order to describe more adequately the firm's activities which now include the manufacture of heating and temperature control equipment for various types of transportation.

—o—

Reliance Electric & Engineering Co., Cleveland, manufacturer of electric motors, has purchased from Detroit Steel Corp., Detroit, its land and buildings at 1170 Ivanhoe Rd., Cleveland, which had been occupied for the past ten years by Detroit Steel's Cleveland warehouse. The steel firm is constructing a new facility in the city.

—o—

Permanente Products Co. Inc., Oakland, Calif., has named Hill Chase & Co. Inc., Philadelphia, as its distributor for aluminum in the Philadelphia area.

—o—

Peninsular Steel Co., Detroit, producer of drill rod, tool, cold drawn and alloy steels, has opened a warehouse at 2531 Burton Ave., Indianapolis. Riley Reser is district manager.

—o—

Perfection Stove Co., Cleveland, maker of oil-burning appliances, announces that it will enter the gas appliance field. Capacity at its Ivanhoe Rd. plant will be doubled to handle the new line.

—o—

Oliver Iron & Steel Corp., Chicago, has appointed Bell Steel Sales Inc., Milwaukee, as sales representative for its industrial fasteners in Wisconsin.

—o—

Newcomb-Detroit Co., Detroit, manufacturer of finishing and dust arresting systems, has acquired Newcomb Engineering Co., Grand Rapids, Mich. Although both firms were founded by C. B. Newcomb, they had operated, until now, as separate corporations.

—o—

National Screw & Mfg. Co., Cleveland, maker of fasteners, has purchased Chester Hoist Co., Lisbon, O., manufacturer of hoists and trolleys. Firm will be operated as Chester Hoist Division of National, with George N. Bolton as manager.

—o—

Armstrong Bros. Tool Co., maker of tools, has moved to its new office and works at 5200 W. Armstrong Ave., Chicago.

—o—

Edward Valves Inc., East Chicago, Ind., subsidiary of Rockwell Mfg. Co., has appointed Charles H. Tate Co., Cleveland, as its sales representative in northern Ohio and Erie county, Pa., for the Edward line of cast and forged steel valves.

—o—

Geometric Tool Co., New Haven, Conn., division of Greenfield Tap & Die Corp., has named the following firms as distributors of its machinery and tools for cutting screw threads: Scallan Supply Co., Cincinnati; Ross-Willoughby Co., Columbus and Springfield, O.

—o—

International Harvester Co., Chicago, has purchased Metropolitan Body Co., Bridgeport, Conn., which it will operate as a wholly-owned subsidiary, with G. E. Houghten as manager. Metropolitan has supplied International Harvester with a special type of bodies for its lighter trucks.

—o—

Globe Products Mfg. Co., Los Angeles, manufacturer of machine tools, has made arrangements with U. S. Electrical Motors Inc., Los Angeles, to manufacture the latter's line of grinders and buffers. U. S. motors for the devices will be used exclusively.

—o—

Dilks Co., Seymour, Conn., has been newly formed to manufacture air column loud speakers under the Dilks patents.

—o—

Truck-Man Inc., formerly a division of Yard-Man Inc., Jackson, Mich., has been incorporated as a separate and distinct unit to carry on the manufacturing of a gasoline-powered, hydraulic lift truck and a gasoline-powered platform truck. Yard-Man Inc. continues as manufacturer of lawn mowers exclusively.

—o—

Aluminum Co. of America, Pittsburgh, reports that its plant at Vancouver, Wash., produced 150 million pounds of pigs and ingots in 1947.

—o—

Rust Engineering Co., Pittsburgh, reports that in 1947 it completed design and construction of industrial plants and facilities valued in excess of $50 million.

—o—

Arco Co., Cleveland, manufacturer of industrial finishes, has purchased for $124,500 a building in Cleveland from Van Dorn Iron Works. Facility will be used for warehouse purposes.

—o—

Bowser Inc., Ft. Wayne, Ind., manufacturer of pumps and meters, has purchased Buckeye Laboratories, Cleveland. Buckeye equipment, pilot laboratory and key personnel will move to Ft. Wayne, but Buckeye's steel fabricating division will remain in Cleveland under the name of Morgan Steel Products.

—o—

North American Philips Co. Inc., New York, maker of x-ray apparatus, has named Byron Thompson & Co., Jacksonville, Fla., as its distributor in Florida.

The Business Trend

INDUSTRIAL operations as a whole stabilized in the week ended Jan. 17 following a quick rebound from the year-end slump. STEEL's index of industrial production edged upward one point to 169 per cent (preliminary) of the 1936-1939 weekly average, indicating that trade and output were again at the level of the closing months of 1947. Most basic industries are now operating at rates considerably in excess of those of a year ago, with further gains in some fields anticipated in the near future, barring tightening in raw materials supply or labor difficulties.

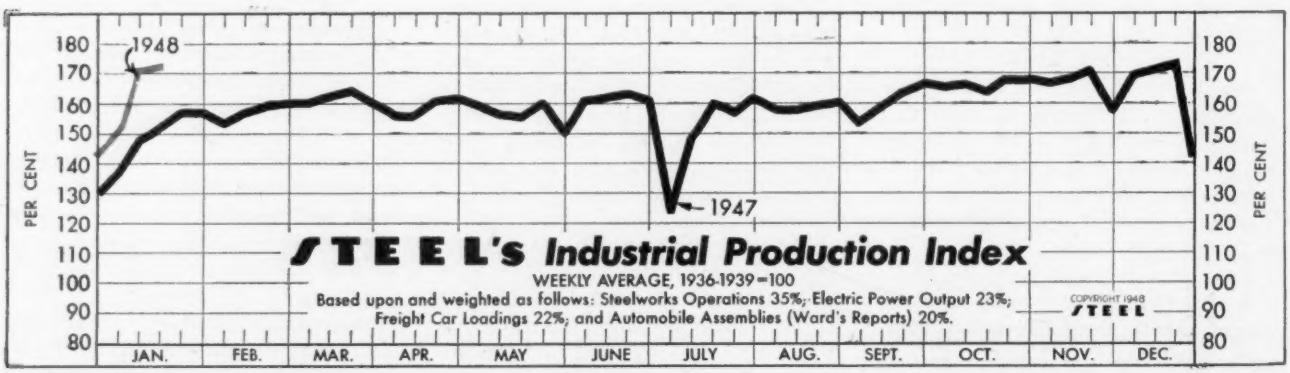
STEEL—Scheduled operations of steel mills for the week ended Jan. 17 were the highest since May 15, 1944, American Iron & Steel Institute reported, indicating that 1,723,200 net tons of ingots and castings were produced, the largest weekly tonnage since May 14, 1945. The institute's newly revised figure for the industry's 1948 weekly capacity is 1,802,476 net tons.

AUTOS—Model changeovers in three General Motors divisions and scattered labor walkouts resulted in a 3098 unit decline in car and truck output in the United States and Canada in the latest week, *Ward's Automotive Reports* announces. Other companies' model changeovers will probably have adverse effect on production in coming weeks.

CONSTRUCTION—Valuation of building permits issued by 215 cities in 1947 reached the highest level since 1928, totalling $3,086,202,148, according to a Dun & Bradstreet compilation. This was a 20.7 per cent increase over the valuation for 1946. December permit valuation of $308,085,440 was higher than for any previous December and was 6.3 per cent above the November figure and more than double the permit value of the like 1946 month. *Engineering News Record* reports that in 1947, dollarwise, all-time highs were established in commercial building volume, in highway construction, for sewage works and for bridges, with, respectively, $1,898 million, $794 million, $175 million and $196 million spent.

PRICES—A fractional (0.1 per cent) increase in wholesale prices was recorded by the Bureau of Labor Statistics in the week ended Jan. 10, with its index now registering 164.5 per cent of the 1926 average. Lower agricultural prices were more than offset by advances in nonagricultural quotations. Manufactured products generally were higher priced, the average increase being 0.4 per cent. Raw materials, however, were 0.9 per cent lower than in the previous week.

TRUCK LOADINGS—Reports from 234 trucking firms in 40 states showed total loadings in November of 2,135,692 tons, a 7.7 per cent increase over the like month of 1946 but 14.6 per cent less than had been carried in October, American Trucking Associations states. The associations' index, based on tonnage in 1938-1940, stood at 217. Carriers of iron and steel, hauling about 7 per cent of total truck tonnage, noted a 7.8 per cent decline from October loadings, although tonnage hauled was 25.6 per cent greater than in November, 1946.



The Index (chart above): Week Ended Jan. 17 (preliminary) 169 Previous Week 168 Month Ago 173 Year Ago 152

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	98.0	97.0	97.5	91
Electric Power Distributed (million kilowatt hours)	5,370	5,278	5,368	4,857
Bituminous Coal Production (daily av.—1000 tons)	2,280	1,924	2,249	2,283
Petroleum Production (daily av.—1000 bbl.)	5,326	5,313	5,284	4,624
Construction Volume (ENR—Unit $1,000,000)	$83.3	$85.7	$130.1	$110.2
Automobile and Truck Output (Ward's—number units)	108,178	111,276	120,657	75,166

* Dates on request. † 1947-48 weekly capacity is 1,749,928 net tons.

TRADE				
Freight Carloadings (unit—1000 cars)	822†	831	832	828
Business Failures (Dun & Bradstreet, number)	61	87	91	51
Money in Circulation (in millions of dollars)‡	$28,374	$28,658	$28,923	$28,518
Department Store Sales (change from like wk. a year ago)‡	+8%	+9%	+10%	+24%

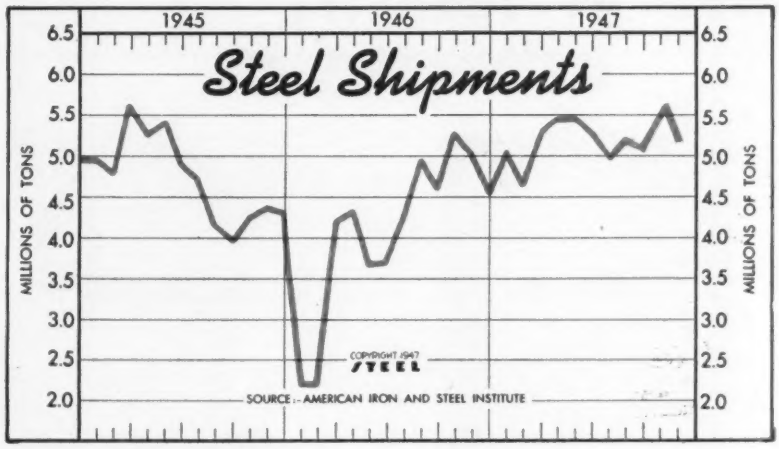
† Preliminary. ‡ Federal Reserve Board.

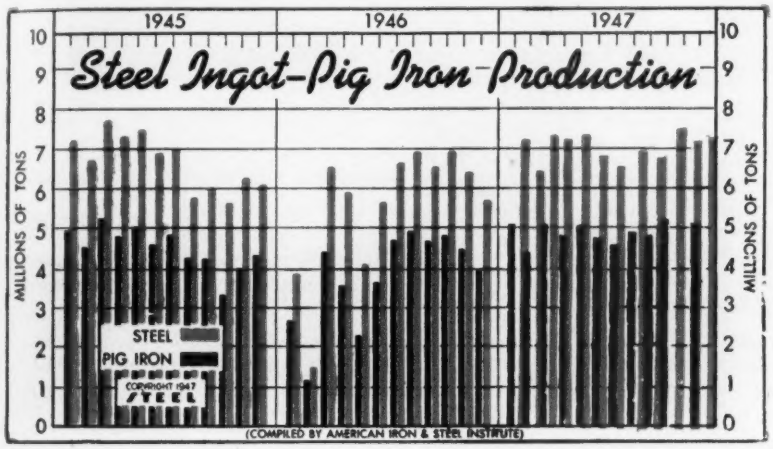
Steel Shipments

(Net Tons)

	1947	1946	1945
Jan.	5,061,333	2,189,369*	4,940,160
Feb.	4,626,424	2,189,368*	4,776,377
Mar.	5,304,415	4,213,913	5,632,155
Apr.	5,445,993	4,335,694	5,254,064
May	5,442,343	3,666,677	5,417,051
June	5,263,711	3,687,509	4,891,228
July	4,974,566	4,259,494	4,696,895
Aug.	5,278,223	4,965,456	4,123,578
Sept.	5,118,839	4,589,902	3,955,198
Oct.	5,681,597	5,260,832	4,267,177
Nov.	5,216,990	5,019,984	4,366,567
Dec.	.....	4,533,420	4,297,502

* Figures for January and February, 1946, are merely averages derived from a report that combined shipments for those two strike-affected months into a total of 4,378,737.





Iron, Steel Production

(Net Tons—000 omitted)

	Steel Ingots			Pig Iron	
	1947	1946	1945	1947	1946
Jan.	7,213	3,873	7,204	5,071	2,645
Feb.	6,422	1,393	6,653	4,550	1,148
Mar.	7,307	6,509	7,706	5,123	4,424
Apr.	7,043	5,861	7,290	4,830	3,614
May	7,329	4,073	7,450	5,081	2,275
June	6,969	5,626	6,841	4,810	3,682
July	6,570	6,619	6,986	4,585	4,705
Aug.	6,982	6,924	5,735	4,917	4,538
Sept.	6,789	6,556	5,982	4,801	4,687
Oct.	7,560*	6,952	5,597	5,228	4,815
Nov.	7,233	6,458	6,200	5,015	4,435
Dec.	7,370	5,761	6,058	....	3,992
Total	84,788	66,603	79,702	....	*45,379

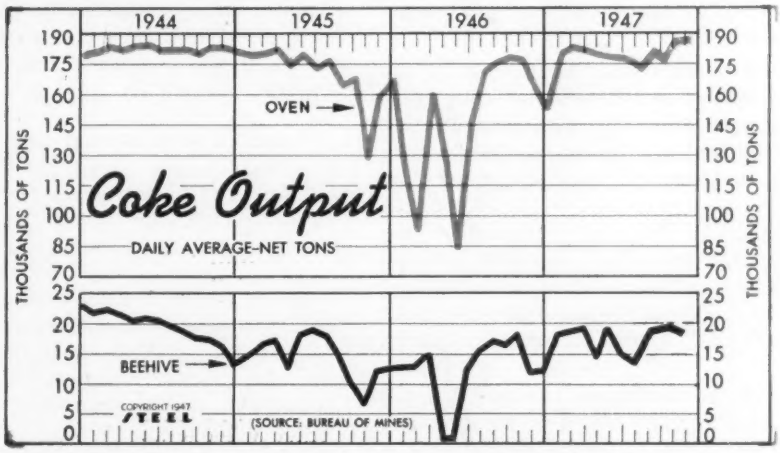
* Adjusted.

Coke Output

Bureau of Mines

(Daily Average—Net Tons)

	Oven		Beehive	
	1947	1946	1947	1946
Jan.	181,245	122,570	18,124	13,093
Feb.	183,189	93,985	18,372	13,140
Mar.	182,529	161,290	18,725	14,962
Apr.	179,428	128,394	14,315	713
May	178,398	83,019	18,922	869
June	177,416	148,100	15,054	42,600
July	173,312	172,700	13,582	15,600
Aug.	181,697	177,300	18,346	17,400
Sept.	179,872	179,200	19,397	16,700
Oct.	187,009	178,900	19,786	18,500
Nov.	188,342	165,100	18,153	12,400
Dec.	.....	153,826	.....	12,302
Ave.	.....	146,877	.....	11,991



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,188	$12,950	$15,543	$12,105
Federal Gross Debt (billions)	$256.5	$256.5	$257.0	$259.5
Bond Volume, NYSE (millions)	$32.4	$28.4	$37.2	$26.7
Stocks Sales, NYSE (thousands)	4,617	5,178	6,942	5,896
Loans and Investments (billions)†	$65.1	$64.8	$65.1	$55.6
United States Gov't. Obligations Held (millions)†	$37,642	$37,227	$37,564	$35,802

† Member banks, Federal Reserve System.

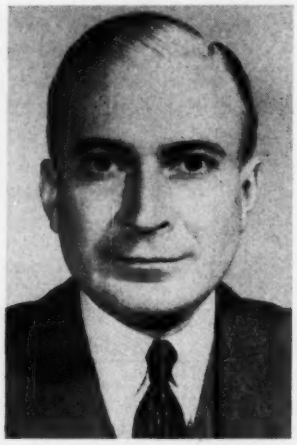
PRICES

STEEL's composite finished steel price average	$78.18	$78.05	$76.09	$69.36
All Commodities†	164.5	164.4	161.4	140.0
Industrial Raw Materials†	182.9	184.5	180.9	153.1
Manufactured Products†	157.3	156.6	153.7	135.4

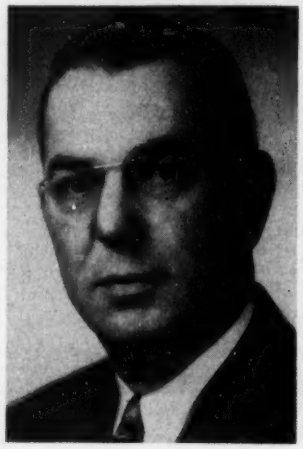
† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

CLARENCE M. STRONG



SHERLOCK DAVIS



JAMES D. GLENN

Clarence M. Strong has been appointed director of purchases of F. L. Jacobs Co., Detroit. He joined the Jacobs company after association with Plymouth Steel Co., where he was general manager.

—o—

Superior Foundry Inc., Cleveland, announces appointment of **John E. Dunbar** as sales manager of the company. He has been associated for the past 10 years with White Motor Co., Cleveland, as director of purchasing.

—o—

John C. Wallace has retired as vice president and director of sales, Perfection Stove Co., Cleveland. He will continue as a board member, and as a member of the executive committee.

—o—

M. D. O'Leary, director of purchases and office manager, Chicago Vitreous Enamel Product Co., Cicero, Ill., has been promoted to works manager and assistant to vice president.

—o—

R. B. Wilkinson has been elected treasurer of Graybar Electric Co., New York, to be effective March 1, when **E. W. Shepard,** the company's treasurer since 1926, retires on a service pension. Mr. Wilkinson has been serving, since 1946, as assistant treasurer.

—o—

William L. Lentz, vice president, American Locomotive Co., New York, has added to his present duties those of **J. B. Ennis,** who has retired as senior vice president. Also retiring from the company is **Frank J. Foley,** former director and vice president, who has been serving as a consultant for the last year.

—o—

James C. Bjorkholm has been appointed advertising manager, Foil Division, Reynolds Metals Co., Louisville. He will have headquarters in Richmond, Va.

—o—

Sherlock Davis, formerly colonel, General Staff Corps, United States Army, has been named president, Charles Fischer Spring Co., Brooklyn, N. Y. In connection with a projected expansion, the company has elected a new board of directors, consisting of Colonel Davis, **Fred Hunter,** president, American Time Co., **Judge Sol Rubin, Louis Septimus** and **Julius Yablok.**

—o—

Dominion Steel & Coal Corp. Ltd., Montreal, Canada, announces the appointment of **C. B. Lang** as president, succeeding **Arthur Cross,** who becomes chairman of the board.

—o—

Harry Green and **Carl Senn** have been promoted to consulting positions on the staff of Falk Corp., Milwaukee. Mr. Green assumes duties as consultant on machine shop operations, while Mr. Senn becomes consultant on methods engineering. **B. C. Bugbee,** former production control manager, has been appointed machine shop superintendent, and **Robert Fischer** has been placed in charge of all standards throughout the plant.

—o—

Thomas B. Hasler, formerly president, Wilson Welder & Metals Co. Inc., subsidiary of Air Reduction Co. Inc., New York, has been elected chairman of the board of directors of the subsidiary company, succeeding **C. E. Adams Jr.,** who resigned as chairman and director. **F. E. Adams Jr.** has been elected president and director and, in addition, will hold the position of director of apparatus research and production, Air Reduction Co. Inc.

—o—

James D. Glenn has been appointed general manager of stainless steel sales for Crucible Steel Co. of America, New York. He has been vice president in charge of sales, Eastern Stainless Steel Corp., Baltimore.

—o—

John P. Stevens Jr., president, J. P. Stevens & Co. Inc., New York, has been elected a director of American Brake Shoe Co., New York. **John A. Fellows** has been appointed assistant chief metallurgist, research center at Mahwah, N. J., for the company.

—o—

American Pulley Co., Philadelphia, announces election of **Frank E. Brown** as secretary and treasurer, succeeding **G. C. Munoz,** who retired. **Caleb F. Fox III,** vice president, will relinquish responsibility for production to succeed Mr. Brown in charge of sales and advertising.

—o—

Fred E. Kendall has been appointed director of research, Master Builders Co., Cleveland.

—o—

J. Howard Patton has been appointed general manager of operations of all manufacturing properties, Brainard Steel Co., Warren, O.

—o—

Western Electric Co. Inc., New York, has appointed **Arthur C. Link** as manager of organization planning, a new division at company headquarters at New York.

—o—

Hugo E. Johnson, formerly research associate, Carnegie-Illinois Steel Corp., U. S. Steel Corp. subsidiary,

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has been appointed to the administrative staff of Battelle Memorial Institute, Columbus, O.

—o—

Ernest G. Jones has been elected director and vice president of Skagit Steel & Iron Works, Sedro-Woolley, Wash.

—o—

Hans E. Hansen, sales representative, Washington Division, Columbia Steel Co., subsidiary of U. S. Steel Corp., has retired after 35 years' association with the U. S. Steel Corp. subsidiaries.

—o—

C. P. Oldham has been named Eastern Division sales manager of Permanente Products Co., a Henry Kaiser corporation. He will direct Kaiser aluminum sales in New York, eastern Pennsylvania, Maryland, Delaware, Virginia, New Jersey and the New England states. **Charles S. French** has been named manager of Permanente's Central Sales Division, and **Charles S. Barnum,** in charge of the Detroit sales office.

—o—

Howard Ketcham, New York, designer and engineer, has been retained by Rigid-Tex Corp., Buffalo.

—o—

Frederick P. Combier has been appointed manager of branch sales of the wire and cable department, United States Rubber Co., New York.

—o—

Joseph J. Hite, American Hoist & Derrick Co., St. Paul, Minn., has been promoted to the post of assistant chief engineer. He formerly held the position of development engineer, and more recently of office engineer.

—o—

Four major personnel changes in the electrochemicals department of E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., are: **Donald O. Notman,** director, Technical Division, has been made assistant general manager. He succeeds **Samuel G. Baker,** who becomes general manager following the retirement of **F. S. MacGregor. Dr. E. A. Harding,** director of production, has been named director of the Technical Division, succeeding Mr. Notman. **Russel L. Hardy,** manager of the Niagara Falls, N. Y., plant, becomes director of production, and **Dr. N. C. Jones,** assistant manager of the plant, succeeds Mr. Hardy.

—o—

Eugene G. Sheasby has been appointed manager of the Market Development Division, general sales department, United States Steel Supply Co., Chicago, subsidiary of U. S. Steel Corp.

—o—

Roger E. Gay, president, Bristol Brass Corp., Bristol, Conn., has been elected a director of National Association of Manufacturers.

—o—

Harvard P. Stewart has been appointed manager of marine sales for the Bay Area Yards of Bethlehem Steel Co., Shipbuilding Division, San Francisco. He succeeds the late **John T. Greany.**

—o—

Robert Klare, formerly manager of Federal-Mogul Corp.'s St. Johns, Mich., plant, has been named manager of the company's plant at Greenville, Mich. He is succeeded at St. Johns by **Elmer Pett.**

—o—

C. H. Williams has been appointed chief engineer, Carnegie-Illinois Steel Corp., U. S. Steel subsidiary. He has been chief engineer for the Pittsburgh district of the subsidiary since 1943, and associated with that company since 1930.

—o—

Anaconda Copper Mining Co., New York, announces retirement of **E. E. Littler,** who has been employed by the company for over 48 years and as its purchasing agent since 1925. **A. Baird Harris Jr.** has been appointed to succeed Mr. Littler.

—o—

William O. Lawrence has been appointed assistant manager of the Buffington, Ind., plant of Universal Atlas Cement Co., a U. S. Steel Corp. subsidiary.

—o—

Leland E. Grafft has been appointed contracting manager in Minneapolis by American Bridge Co., U. S. Steel Corp. subsidiary. He succeeds the late **Gillette Anderson.**

—o—

Hugh J. Hales has been appointed service manager, and **Eugene Foley,** organization and analysis manager, for Pontiac Motor Division, General Motors Corp., Detroit. They succeed **Earl Taber** and **Earl Gouldman,** who have resigned to become partners in a Pontiac dealership at Atlanta.

—o—

Hercules Powder Co., Wilmington, Del., announces the appointment of **L. C. LeBron** as assistant manager of its explosives department's Contractors Division in Wilmington.

—o—

Theodore F. Nessler has been appointed to a newly created position of purchasing manager for the chemical department of General Electric Co., Schenectady, N. Y.

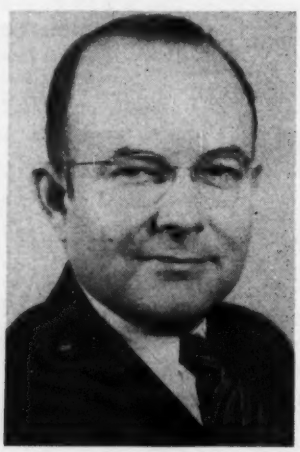
—o—

Jules Muller has been appointed director of engineering, E. W. Bliss Co., New York. He will be responsible for co-ordination of engineering between the various Product Divisions. Prior to his appointment, Mr. Muller supervised welding design and manufacture for Bliss machinery.

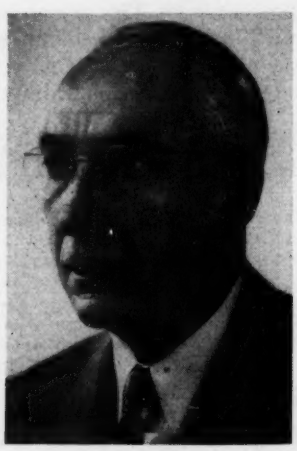
—o—

Phillip J. Kimball has been named assistant general manager, explosives department, E. I. du Pont de Ne-

JOSEPH J. HITE



C. H. WILLIAMS



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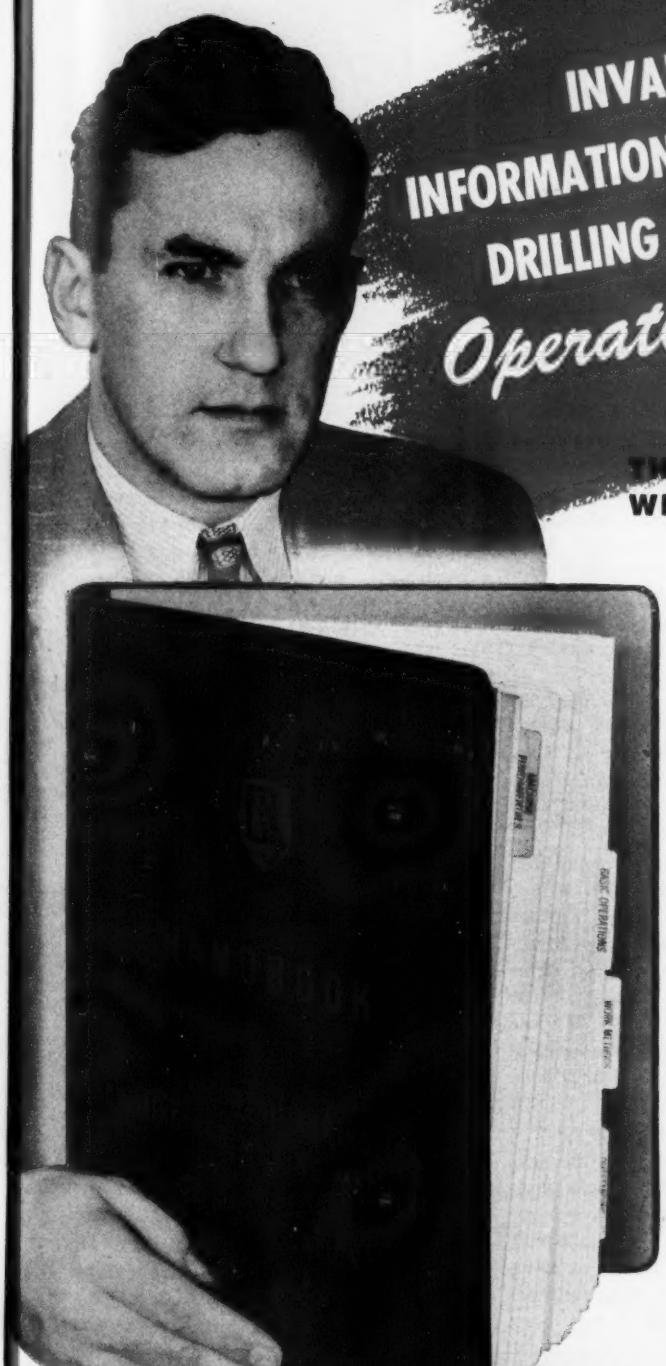

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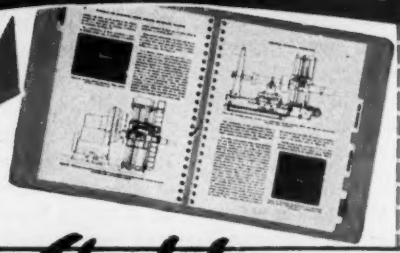

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FOND DU LAC, WIS.

mours & Co. Inc., Wilmington, Del., succeeding **Harry F. Brown**, who has been promoted to general manager, assuming the position of **William H. Ward,** recently elected a vice president. **Fred R. Wilson** succeeds Mr. Kimball as manager of the Explosives Division of the company's explosives department, and is succeeded, in turn, by **T. R. Carlson** as director of production of the division.

—o—

John F. Crossin has joined Crosley Motors Inc., Cincinnati, as manager of the Commercial Sales Division.

—o—

Philip H. Zuiderhoek has been named factory manager, Tuscaloosa, Ala., plant of B. F. Goodrich Co., Akron, succeeding **Joseph C. Herbert,** assigned other duties with the company.

—o—

G. E. Tenney, district manager, Chicago office of Lincoln Electric Co., Cleveland, has been appointed service manager, to direct the policies and operations of a newly expanded service department.

—o—

Bloom Engineering Co., Pittsburgh, announces opening of a sales office at 6753 Stoney Island Ave., Chicago, under the direction of **A. A. Fennell,** district manager.

—o—

Albert E. Brodigan has been appointed regional representative in the Caribbean area for Borg-Warner International Corp., Chicago. He will make his headquarters in Mexico City.

—o—

Joslyn Mfg. & Supply Co., Chicago, announces appointment of **James A. Downey** as sales representative for the Philadelphia, Baltimore and Washington districts. Associated with him will be **Roy H. D'Ardenne,** who for a number of years has been connected with the Rustless Iron & Steel Corp. and the Rustless Division of the American Rolling Mill Co.

—o—

Paul W. Howard has been appointed chief industrial engineer, Crucible Steel Co. of America, Pittsburgh. He had previously been with Sharon Steel Corp.

—o—

Robert W. Russell has joined American Cladmetals Co., Pittsburgh. He formerly had been associated with Jessop Steel Co., Washington, Pa. In his new position he will carry out the installation program at the company's Carnegie, Pa., plant.

—o—

Joseph F. Egan has been promoted from New York Division manager to eastern regional manager for Bendix Home Appliances Inc., South Bend, Ind. He joined Bendix Home Appliances Inc. last October, and had been formerly with Camfield Mfg. Co., Grand Haven, Mich.

—o—

George F. Karch has been elected a director of Reliance Electric & Engineering Co., Cleveland.

—o—

Andrew A. VonMelker has been appointed manager of the Trenton, N. J., Works of the Lamp Division, Westinghouse Electric Corp., Pittsburgh.

—o—

Robert L. Gibson has been named manager of a newly created personnel division of the chemical department, General Electric Co., Schenectady, N. Y. He will continue, also, as manager of the Advertising and Sales Promotion Division. Assisting Mr. Gibson will be **Everett W. Bickford** as manager of union relations, **George M. Hartley** as supervisor of planning and preparation, **Karl B. McEachron Jr.** as manager of educational activities, and **Arthur G. Sanford** as manager of personnel services and safety.

—o—

Jack R. Lakin has been appointed general sales manager, Drop Forge Division, Willys - Overland Motors Corp., Toledo, O. He will co-ordinate all phases of sales, advertising, sales promotion, and public relations for the expanded Forge Division. He has been with Willys-Overland since 1942, and in the automotive industry since 1919.

—o—

James Flett Organization, Chicago, announces appointment of two divisional sales managers and a new manager of its Cleveland office: **Harry Pinkus** has been made Western Division sales manager, with headquarters in Chicago; **James Corbin** has been advanced to sales manager, Eastern Division, with headquarters in New York; and **Chelson E. Sayer** has been named manager of the firm's office in Cleveland.

—o—

Dampney Co. of America, Hyde Park, Boston, Mass., announces the appointment of **W. T. Quimby,** Springfield, Mass., as special representative in the New York area for Apexior and Thur-Ma-Lox protective coatings. Prior to service during the war, Mr. Quimby had been vice president-sales for Quimby Pump Co., Newark, N. J.

—o—

Cleveland Graphite Bronze Co., Cleveland, in grouping its manufacturing operations in heavy-duty types

R. W. DAVISON

of engine bearings into a separate unit, has promoted **M. J. Merlin** from master mechanic to manager of the new unit, and **C. E. Wilcox,** from equipment engineer, to master mechanic. **Arthur C. Schroeder** has been made general foreman of the heavy-wall unit.

—o—

R. W. Davison has been appointed manager of sales, Hot Rolled Products Division, Sheffield Steel Corp., Kansas City, Mo.

—o—

John L. Holloway, president, Crane Co., Chicago, has been elected a member of the board of trustees of Illinois Institute of Technology, Chicago, to replace **John H. Collier,** chairman of Crane Co., who resigned as a trustee.

—o—

Edward F. Resch has been appointed district sales manager of the Philadelphia territory of Mercer Tube & Mfg. Co., Sharon, Pa. He also has been elected Philadelphia district sales manager by the Sawhill Mfg. Co. of Sharon.

—o—

Berkeley Industries, Jersey City, N. J., announces election of three new members to its board of directors: **David Ross** and **Nat Herman,** vice presidents, and **Albert B. Dorr,** recently elected secretary.

—o—

Richard H. DeMott, vice president in charge of sales, SKF Industries Inc., Philadelphia, has been elected vice president of the Exhibitors Advisory Council, with which he has been actively associated for more than 20 years.

—o—

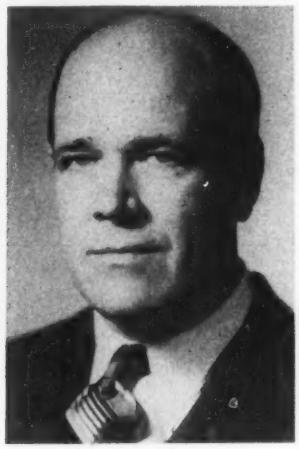
Plasteel Products Co., Washington, Pa., announces appointment of **Chester Rice & Associates** as representatives for a number of Ohio markets. The representatives will maintain offices in the Hippodrome Bldg., Cleve-

DONALD M. LAFLIN

Appointed assistant general sales manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. Noted in STEEL, Jan. 19 issue, p. 60

BAY E. ESTES JR.

Who has been appointed director of commercial research, United States Steel Corp. of Delaware. Noted in STEEL, Jan. 19 issue, p. 58



JOHN E. MARTIN

Elected president, Firestone Steel Products Co., subsidiary, Firestone Tire & Rubber Co., Akron. Noted in STEEL, Jan. 19 issue, p. 60

land. Associated with Mr. Rice is **Morris J. Koblitz Jr.**

—o—

Wilbur Deutsch has been appointed general sales manager of Trabon Engineering Corp., Cleveland. He joined the organization in 1936, and for the past two years has been in charge of sales and service for the company on the West Coast.

—o—

Dr. Haig Solakian, vice president, chief metallurgist and director of research for A. F. Holden Co., New Haven, Conn., has resigned to accept the position of president, John Ek Industries Inc., Guilford, Conn.

—o—

Paul W. Butz has been appointed manager of the warehouse branch and district sales office at Detroit of Columbia Steel & Shafting Co., and its divisions, Edgar T. Ward's Sons Co. and Summerill Tubing Co., Pittsburgh. Mr. Butz succeeds **T. L. Parker,** who has been transferred to the managerial position at Philadelphia.

—o—

E. George Hartmann has been appointed general sales manager, John A. Roebling's Sons Co., Trenton, N. J. He has been associated with the company since 1940.

—o—

Crawford H. Greenewalt has been elected president of E. I. du Pont de Nemours & Co., Wilmington, Del., succeeding **Walter S. Carpenter Jr.,** who has become chairman of the board of directors. **Lammot du Pont** has resigned the chairmanship, ending a career in the company that began in 1902.

—o—

O. A. Scudder, president, and **B. N. Braun,** secretary-treasurer, have retired from Midland Structural Steel Co., Cicero, Ill. New officers elected by the company are: **Charles F. Jarrard,** president, **William Nemec,** secretary-treasurer, and **O. C. Robbins,** vice president.

—o—

J. K. Sutherland has been elected vice president in charge of sales for Benchmaster Mfg. Co., Los Angeles.

—o—

H. M. Ridlon has been appointed assistant director of commercial research, United States Steel Corp.

OBITUARIES . . .

William B. Simpson, 72, chairman, A. M. Castle & Co., Chicago, died Jan. 13 in that city. Associated with the company since 1901, he became president in 1908 and chairman in 1930.

—o—

Paul W. Cotton, 67, retired vice president of Bethlehem Pacific Coast Steel Corp., San Francisco, subsidiary of Bethlehem Steel Co., died Jan. 14.

—o—

Conrad W. Bischof, 53, treasurer, Copper Clad Malleable Range Co., St. Louis, died of a heart attack Jan. 14.

—o—

Walter G. Zimmermann, 71, retired senior contracting manager, American Bridge Co., Chicago, died Jan. 13.

—o—

Robert W. Hannan, president, Pittsburgh Tube Co., Pittsburgh, died Jan. 11.

—o—

Percy T. Oldham, 58, manager, Marine Division, for Lukens Steel Co. and its divisions, By-Products Steel Co., and Lukenweld, died Jan. 18 of a heart attack.

—o—

Allen F. Edwards, 71, a member of the board, Chrysler Corp., Detroit, and president, Universal Products Co. Inc., died Jan. 13 at his home in Grosse Point Farms, Mich.

—o—

Rodney D. Hall, 71, assistant to vice president, Public Works Division, Worthington Pump & Machinery Corp., Harrison, N. J., died in Hartford, Conn., Jan. 13.

—o—

Paul L. Rathborne, 58, assistant treasurer, American Locomotive Co., New York, died Jan. 13 of a heart attack.

—o—

W. H. Collins, 55, vice president in charge of Shipbuilding Division, Bethlehem Steel Co., Bethlehem, Pa., died of a heart attack in Beaumont, Tex., Jan. 16. Mr. Collins also was a director of the company.

—o—

L. Frederick Bruce, 67, vice president, Joseph Dixon Crucible Co., Jersey City, N. J., died Jan. 13.

—o—

Howard W. Gilbert, 67, engineering assistant to the president, National Malleable & Steel Castings Co., Cleveland, died Jan. 16.

—o—

Neal S. Baldwin, 38, assistant to the general manager, Industrial Sales Division, Sherwin-Williams Co., Cleveland, died Jan. 17.

—o—

Julian F. Gordon, 50, assistant general manager, Stainless Steel Division, Carnegie-Illinois Steel Corp., Pittsburgh, died Jan. 12 as a result of an automobile accident.

—o—

Francis J. Hill, 82, retired president, S & K Mfg. Co., Brooklyn, N. Y., died recently.

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Engineering News . . . AT A GLANCE

ACCURATE CONTROL—High degree of control provided by a constant voltage power supply for use in certain electrolytic determination and separation processes, developed recently by the Electronic Instrumentation lab of National Bureau of Standards, Washington, permits separation of elements whose half-wave potentials differ by only a few tenths of a volt. According to the bureau, one application in which the apparatus is especially successful is the separation of copper from solutions preliminary to polarographic determination of very small amounts of cadmium, lead, tin and other metals.

LOW-COST OUTPUT—Even the smallest of sheet metal shops can produce complex shapes at high speeds by using some of the equipment currently produced by Lockformer Co. of Chicago. One machine, for example, reduces eight distinct operations to one by passing the sheet metal between a series of rollers mounted in tandem, each of which presents a different contour to shape the metal. It can be used to form either galvanized metal or aluminum.

FAST COMER—During the war years, application of tin coating to wide strip steel by electrodeposition proved so successful that wider uses of both heavier and lighter weights of tin coating are being developed. In Pittsburgh recently, Dr. R. E. Zimmerman, vice president, research and technology, U. S. Steel Corp. of Delaware, told the Engineer's Society of Western Pennsylvania that about one half of the tin plate now produced is coated by the electrolytic process. Some experts, he said, go so far as to predict that in a few years electrolytic tin plate will entirely supersede the hot-dip variety.

ANOTHER FIRST—Revolutionary threadless fitting which simplifies any piping layout making it possible to join steel and wrought iron pipe by a brazing method any competent pipe fitter can use was developed recently by Stanley G. Flagg & Co. Inc., Philadelphia. The development, according to the company, serves to reduce both the wall thickness and weight of pipe and presents a joint as strong as the pipe itself. The fitting is seen to open possibilities for enlarged use of steel and wrought iron piping.

BIG SHAVE JOB—To produce a housing for a new permanent waving machine made by Nestle-LeMur Co., General Electric's plastics division at Meriden, Conn., used a steel mold which weighed nearly 3 tons. According to GE, more than ½ ton of metal was "shaved" from the original steel block to form the cavity for the huge mold. Housing itself weighs only 10 pounds and measures 21 inches long, 18 inches deep and 10 inches high.

THE SHAPE COUNTS—Round type inclusions are preferred if steel is to have good physical properties in all directions, according to Philip Schane Jr., chief metallurgist, Pittsburgh district, Carnegie-Illinois Steel Corp., speaking on cleanliness of steel before the fifth annual conference of the AIME recently. Notch effect of an inclusion, he stated, might cause rejection during processing, cracks from stresses in heat treatment or failure in service. Also certain inclusions cause low strength and ductility in the transverse direction. When steel is worked, the inclusion may or may not change shape, depending on its physical characteristics at the temperature at which the metal is being deformed.

GUMS "THE WORKS"—Where tiny bearings are used in slow-moving sensitive instruments, relays, etc., difficulties are often experienced with oils due to gumming in service. Since these oils are required to prevent corrosion rather than for lubrication, instrument makers are now experimenting with absolutely dry bearings —all parts being of corrosion-resistant steel. Such bearings, however, can be used only at low speeds under light loads. (p. 50)

AN EFFECTIVE "TEAM"—In modern machine design, extensive use of alloy steels for machine members makes heat treatment a must to obtain maximum benefits available from these steels. Increased tensile strength and improvement of other physical properties are necessary in order to produce machines of reduced weight featuring compactness and high strength. For tools as well as machine components, the particular characteristics required may be achieved by proper steel selections and following correct procedures of heat treating. (p. 55)

DOUBLE PRECIPITATION—One of the better methods used in the volumetric determination of iron makes use of cupferron to separate iron from other elements present. A double precipitation is usually required to free the iron of mechanically entrained molybdenum, tungsten and chromium, but titanium always remains with the iron. In this case, the iron may then be separated from the titanium by hydrogen sulphide in tartrate solution, or it may be selectively reduced by copper powder and titrated in the presence of titanium. (p. 66)

OVERCOME CASTING PROBLEMS—In Los Angeles, Induction Electric Foundry is overcoming many production problems by employing exothermic materials in pouring stainless steels. For example, an exothermic powder compound is placed on riser tops immediately after filling the mold. The compound reacts to generate additional heat which maintains the metal in highly fluid state so that feeding of the casting continues during solidification—the riser being the last to freeze. (p. 76)

By L. E. BROWNE
Associate Editor, STEEL

Lubricants and lubricating systems for successful functioning of antifriction bearings are considered in this sixth part of the current series

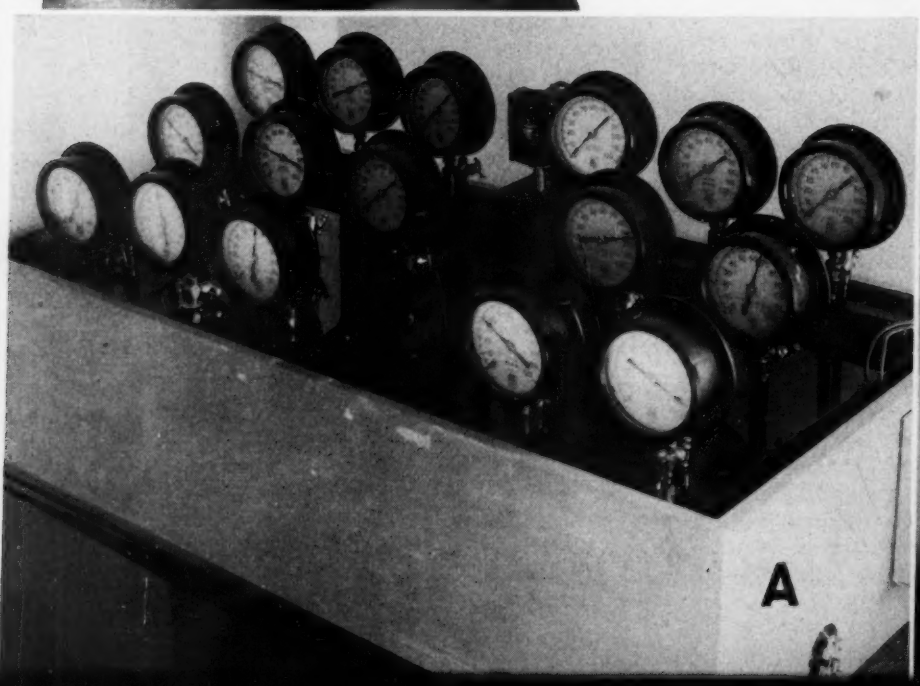
ANTIFRICTION BEARINGS

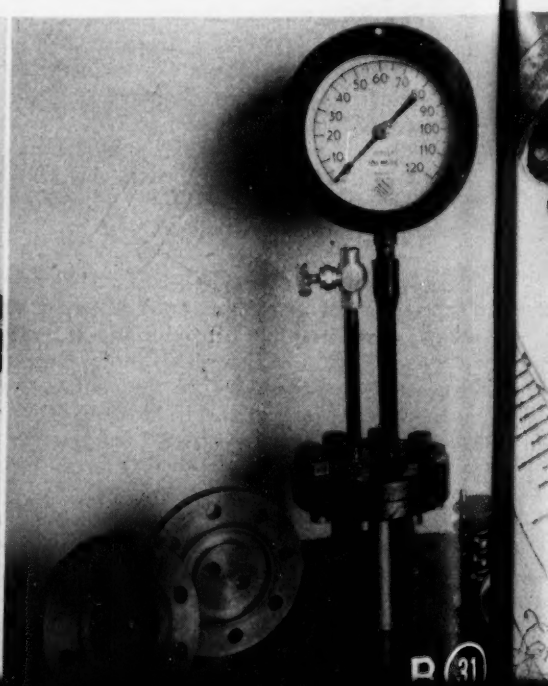
Fig. 31—Equipment used in the Norma-Hoffmann static test for study of accelerated oxidation, measuring the rate which oxygen is absorbed in oxidizing readily oxidizable constituent in petroleum products, oil and lubricating greases. (A)—Stainless steel bombs in an oil bath maintained at constant temperature. Grease is contained in glass trays in a stainless steel rack. (B) Individual bomb with parts

Fig. 32—Bearings after exposure to extreme low temperatures. Untreated and silicon-treated bearings (first and second from lower left, respectively) rotated freely at the lowest temperatures reached. Friction in the untreated bearings increased during cycling from 100 per cent relative humidity and 100° F to —76° due to corrosion. The two organic treated bearings (paraffinic oil-lubricated bearing, third from left; naphthenic oil-lubricated bearing at extreme top right) were almost frozen at low temperaures

Fig. 33—Corrosion of outer surfaces of bearings after severe temperature humidity cycling and long exposure to 100 per cent relative humidity at 100° F. Bearing lubricated with silicon oil (second from left) shows less corrosion than other bearings tested. Corrosion inhibition of the two organic oil-lubricated bearings (right) is good. Napthenic oil (bearing at extreme right) performed slightly better than the paraffinic. Bearing at extreme left was not protected by lubricant. Note rust on inner surfaces

Fig. 34—Top, conventional filter type sight feed oiler; bottom, air mist lubricator. Courtesy Fafnir Bearing Co.





SO important is lubrication for maximum performance of antifriction bearings, this factor must be given major consideration in making the proper choice in design and mounting for most applications. Closely allied with lubrication are seals and closure designs, notably in ball bearing applications where oil is the lubricant.

There have been marked improvements in bearing lubricants and the lubrication of antifriction bearings is becoming of more and more importance as the operating conditions become more severe and as the demand for antifriction bearings requiring no relubrication over long periods becomes more general. The proper selection of a bearing lubricant is equally as important as the size and type of bearing and its mounting.

It is well recognized that antifriction bearings require adequate lubrication, in fact, successful operation is dependent upon good lubrication. Often the problem of applying the proper lubricant is more complicated than selection and mounting of the bearings themselves. Oil lubrication in general is less troublesome than grease lubrication but the trend toward prepacked grease-lubricated bearings is pronounced due to the advantages of compactness and simplicity of mounting, obtainable by using such bearings. However, in many cases it is impossible to use anything but oil as a bearing lubricant.

At very high speeds most greases create a high torque and are not acceptable for that reason. High-speed grinding spindles, for instance, are being successfully lubricated by an air-oil mist applied at a uniform rate and used to carry away dirt and impurities as they escape through the seals.

Since the carrying capacity of a ball bearing is not dependent on maintenance of an oil film between contact surfaces, lubrication is based on entirely different principles of operation than for plain sleeve bearings. Existence of high unit pressures between balls and raceways under load operates against the formation of an unbroken oil film; the load is directly supported by these members in metal-to-metal rolling contact.

As no continuous oil film is present over pressure contact areas between balls and races it might be assumed that support of load would be a function independent of lubrication. But the ability of the bearing to carry heavy loads is due substantially to the deformation developed in balls and races; heat that may be generated from this deformation to a large degree must be dissipated by the bearing lubricant.

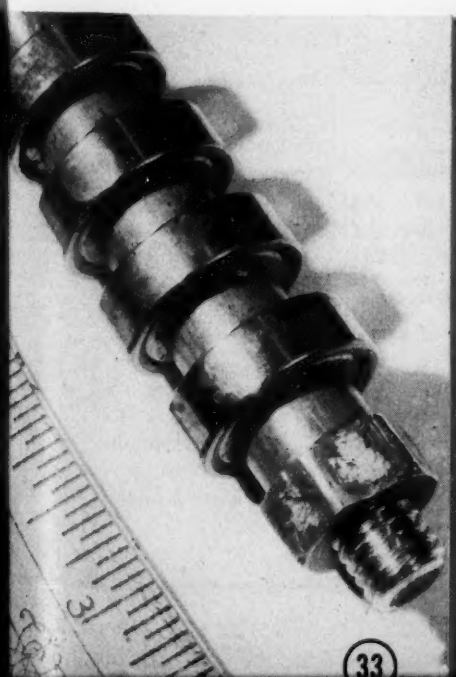
True rolling motion does not exist under all conditions even in the most perfect ball bearing and some slip of balls takes place, resulting in slight sliding friction. Friction, however, is reduced to a negligible point by use of a proper lubricant, giving a coefficient of friction less than in any other type of bearing in commercial use. The lubricant is also a protective agent for highly polished surfaces of balls and races against rust and corrosion; when grease is used some protection against the entrance of foreign matter, dust and dirt, is afforded.

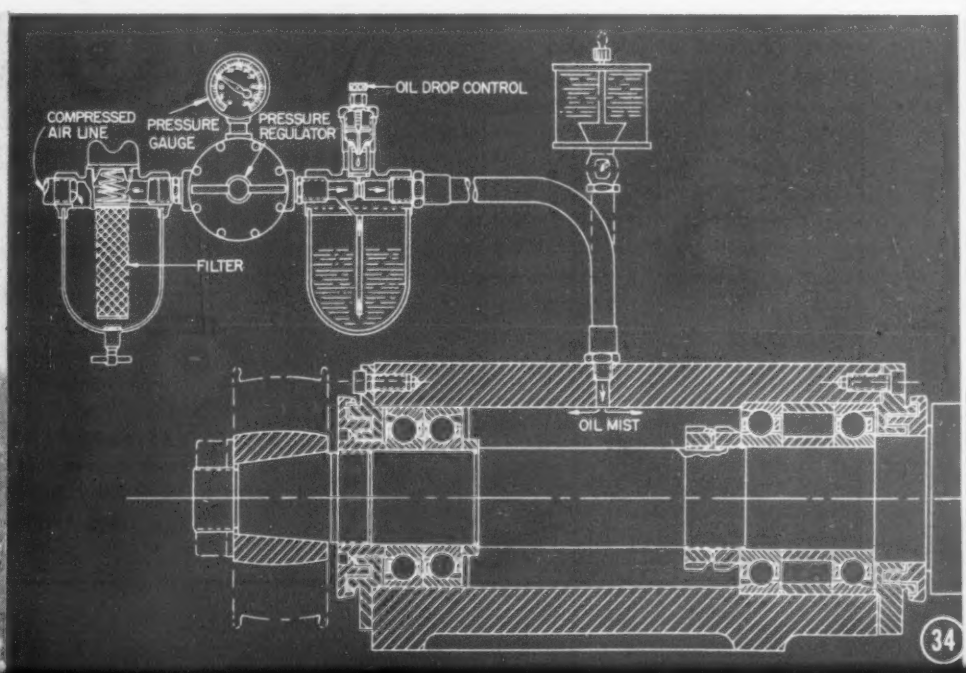
There are numerous systems employing oil and grease, but an important precept in the lubrication of antifriction bearings is that a relatively small quantity of lubricant will, if consistently present, suffice. Frequently more trouble develops from excess lubrication than from too little; both conditions should be avoided.

Maximum operating temperature must be given careful consideration when grease is utilized; housing design relating to the proximity of the grease to the bearing is also of major importance. For operating temperatures to 200° F at speeds up to 5000 revolutions per minute, soft grease, No. 2 or No. 3 grade or heavy oils are generally satisfactory.

Greases or oils containing vegetable or animal oils should be avoided. They have a tendency to become rancid and to develop free acids. Solidifying matter, graphite, pumace, talc, resin, and others, act as a lapping compound, resulting in rapid wear of ball bearings. A lubricant not in itself injurious to bearing surfaces in original form or through deterioration is best and for this reason, since it contains no free acids, a pure mineral lubricant is most satisfactory.

Increasing use of prelubricated grease-packed sealed balls under a variety of operating conditions, presents





many new problems to the grease-maker. While records show that grease-packed bearings have been in service at normal temperatures for as long as 10 years without relubrication, there are now requirements for high-temperature greases that will not deteriorate or become ineffective after long periods of service.

New high-temperature insulating materials for electric motors and generators have been somewhat limited in their use by the difficulty of obtaining a bearing and lubricant that will withstand high temperatures. It has been possible by special heat-treatment procedures to prevent dimensional change of bearing parts or appreciable reduction in hardness at temperatures up to 350° F. Some of the new silicone greases show good possibilities for long-term lubrication at high temperature and may ultimately prove to be the answer to the problem.

First requirement of a grease for prepacked bearings is resistance to oxidation or breakdown after long periods of storage or use. High temperature and humidity tend to hasten this oxidation. The Norma-Hoffmann oxidation bomb test, (Fig. 31), is an accepted method for determining quickly the oxidation resistance of a grease and this test is used to discard inferior lubricants, even before any performance tests are attempted. Greases passing the oxidation test must also have good lubrication qualities and therefore laboratory running tests, correlated with actual experience in the field, are necessary. Experiments seem to indicate that the life of a bearing lubricant is materially reduced as the temperature of operation is increased, and that the life is, roughly, halved with each 20° F rise in temperature.

Refrigerating equipment and all-weather outdoor bearing mountings require greases that do not change too greatly in consistency over a wide temperature range. Through developments made during the war in connection with high altitude flying and the resultant low temperatures involved, greases are now available having extremely low torque, even at temperatures as low as −70° F, Fig. 32. The original troubles with these greases, due to evaporation, have been overcome by the use of new synthetic lubricants. These new greases may be used over a temperature rang from −70° to +200° F without appreciable change in their torque characteristics and without evaporation, Fig. 33.

Where small bearings are used in slow-moving sensitive instruments, relays, etc., difficulties have been experienced with oils due to gumming in service with the result the unit may not always function properly. Since these oils are required to prevent corrosion rather than for lubrication, instrument makers are now experimenting with absolutely dry bearings for such applications, all parts being made of corrosion-resistant steel. Obviously, such bearings can only be used at low speeds and under light loads since there is no lubrication.

For oil lubrication at speeds under 5000 revolutions per minute, the conventional filter-type sight-feed oil system is widely accepted while for speeds over 5000 revolutions per minute an air-mist lubricator is frequently recommended, Fig. 34. The latter method gives a constant supply of lubricant to bearings in form of a mist that is charged with fine particles of oil.

Static oil level in the oil bath system, satisfactory for low and medium speeds, is held usually at a height not exceeding the center of the lowermost ball. Depending on speeds of revolving parts, this level may drop considerably below the idle point when the shaft is turning; a sight gage or other identification for a ready check should be attached. In higher speed applications, where bearings are moderately loaded, oil is often introduced through a filter-type sight feed oiler. Drops per minute in this feed are determined by closely checking operating temperatures.

Forced feed circulating air-cooled lubrication may be required for some vertical mounting applications on large machines where operating conditions are severe with high ambient temperatures present, Fig. 35. Individual lubrication of each bearing location

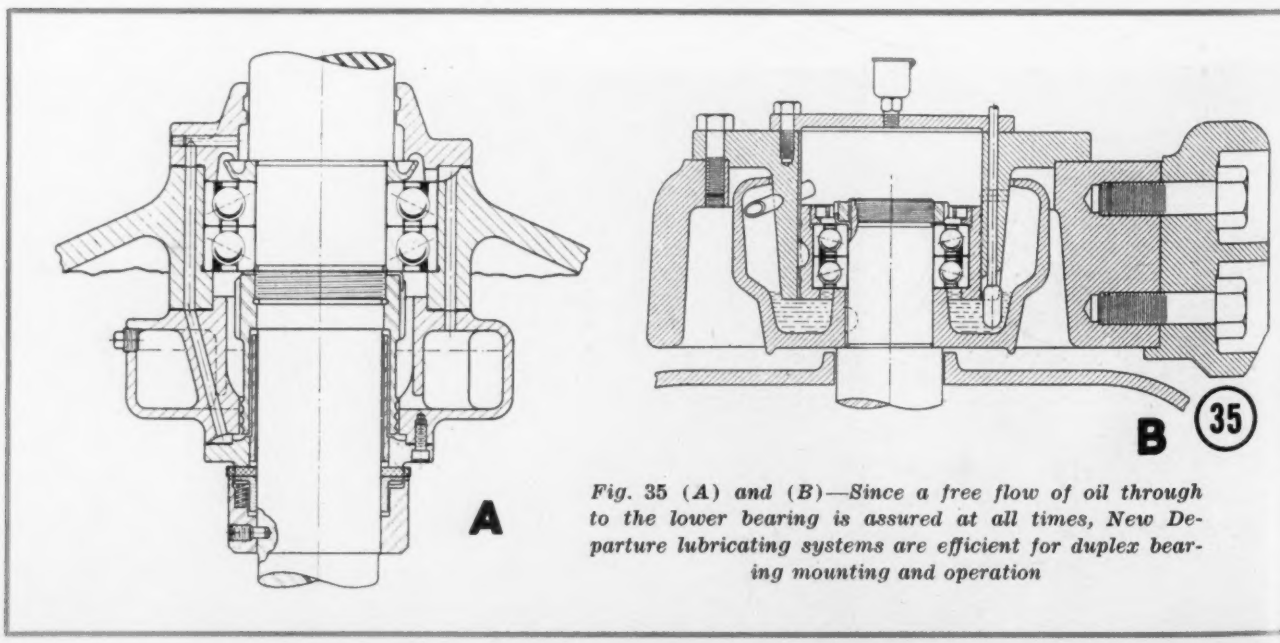


Fig. 35 (A) and (B)—Since a free flow of oil through to the lower bearing is assured at all times, New Departure lubricating systems are efficient for duplex bearing mounting and operation

may be necessary with drain openings large enough to prevent excess oil accumulations. For spindles operating at high speeds approaching limiting speed of the bearing, some variables of the oil mist system is usual.

Compressed filtered dry air in one Fafnir system vaporizes the oil which is metered into the air stream; under about 15 pounds pressure the mist passes through oil parts of the spindle, lubricating and cooling, then escaping through the labyrinth seals. Possible entrance of foreign matter into the bearings is prevented by this continuous passage of air through the seals.

Two major lubricants for ball bearings, oils and greases, are both used over a considerable range of operating temperatures and speeds. Oil is preferred and often necessary where speeds are high, operating temperatures consistently high, when dirt is not excessive and where oil-tight seals are readily included in the mounting assembly. Oil is also desirable if bearings are to be lubricated from a central supply used for other parts of a machine.

Factors favoring grease include: Temperatures under 200° F, moderate speeds, protection from foreign matter, including fumes, avoidance of intricate enclosures and for extended periods of operation without attention.

Common enemy of all ball bearings is the presence of sulphur, alkali or free acids; these cause pitting, etching and corrosion of bearing surfaces and a lubricant free of these elements is necessary. Lubricants are subject to severe churning at higher speeds; if grease is used a high quality is required to eliminate danger of oils separating and escaping from the bearing. This leaves a gummy residue without lubricating value; free rotation of balls and clogged retainers may and probably will result, thereby causing sliding friction.

Tendency of most greases to oxidize on exposure to atmosphere may deposit a hard film on balls and races; tight bearings and noisy operation will result from hardened grease with injury to races. This condition generally follows extended periods of machine idleness; periodic running of bearings and additions of light mineral oil or fresh grease help to minimize effects of the drying and hardening of grease. For meeting the widest range of speed and temperature conditions, many antifriction bearing engineers favor pure sodium base grease with possibly a small percentage of calcium soap added to improve texture. Under churning and at reasonably high temperatures, it has been found that oil and soap separation is slight.

At equivalent loads and speeds, lubrication requirements of ball bearings are less critical than with plain bearings since the pressure between balls and retainer is light. Providing it comes within limits of complete fluid films on bearing parts and full fluid lubrication in such quantity as will not cause excessive over-heating any combination of oil volume and viscosity will permit a bearing to attain full rated life.

Viscosity of oil best suited for the many bearing sizes operating at various speeds and temperatures naturally varies. Bearings, of course, operate over a tremendous range of temperatures and speeds in thousands of applications and the choice of lubricant must cover this range as effectively as possible. On surface speed of balls depends to a large extent methods by which oil is applied to any bearing; but it is in the retainer pockets where lubrication is most important as speeds increase. The ball speed is a better index for arriving at the best lubricating system rather than the shaft for the reason two or more bearings of different size may be used when shaft speeds are the same; the ball and separator speeds may be different in ratio due to the difference in bearing size. One bearing operating on a shaft at 2500 revolutions per minute might be satisfactorily lubricated by oil splash, but a larger bearing in the same machine, also running at approximately 2500 revolutions per minute, might, through increased ball speed, create enough fluid friction to cause overheating; another method in applying oil would be required.

Of the several oil systems, this so-called splash method is one of the most common, notably in gear boxes or assemblies where rotating parts throw oil required for their own lubrication to bearings in the same housing. This system is not used for higher speeds; churning results with the quantity of oil utilized. When oil is taken to a bearing through a chain of gears, protection from chips may be attained with a punched metal slinger or washer clamped against the bearing inner ring on the side from which the oil is received or a shielded bearing may be necessary. Installation is somwhat simplified by use of the latter as a separate washer is eliminated.

One variation of the drop feed oil distribution system includes a reservoir above the bearing from which oil lubricant is filtered through a wick into the housing. Oil level is regulated by an overflow adjusted to the speed, excess being directed to a second reservoir below the bearing.

Problem of close oil application control at increased speeds, the volume required for most efficient operation, becomes more (*Please turn to Page* 73)

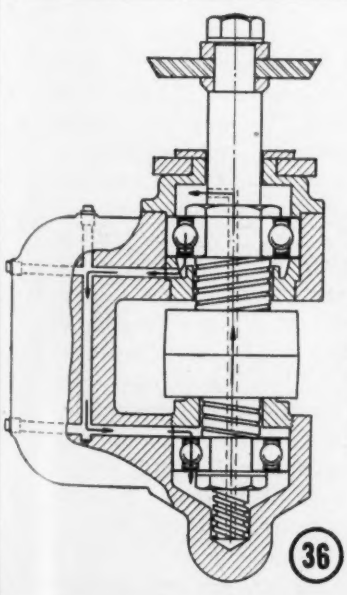


Fig. 36—*In this circulating oil feed system, flow of oil may be regulated by size and pitch of pump threads; increased volume of oil can be provided by larger reservoir at the bottom. New Departure design*

Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

GIDDINGS & LEWIS WRITE A BOOK: Users of metalworking machinery long have been hungry for practical information on ways and means for producing more and better work on American machine tools. American machine tool builders always have had within their organizations tremendous reservoirs of knowledge of that sort—reservoirs constantly being replenished through research and experience.

American machine tool builders always have been exceedingly generous in sharing this machine tool engineering, tooling and production knowledge with customers, prospects and others both in this country and abroad. Industry the world over has profited greatly through this generosity—to such an extent even that some people have had an impression that too much "free engineering" has been dispensed.

That impression is true only to the extent that the manner in which this "free engineering" has been dispensed has not been in "mass production traditions" which American machine tool builders have had so much to do with building up. By that I mean that this dispensing of metalworking information largely has been through the rather slow and costly method of individual letterwriting and actual calls by engineers and service men, rather than through the medium of textbooks through which the knowledge of a few can be transferred to thousands through mass production by printing presses.

Machinery Users Value Textbooks

Of late years there have been some notable exceptions to this rule—exceptions which have won wide acclaim among users of machine tools hungry for that sort of "know how" which makes it possible for them to get full returns on their increasingly heavy investments in increasingly more complex machine tools. I have one of the most recent of these notable exceptions lying on the desk before me as I write this column. It is a 266 page textbook entitled, "Horizontal Boring, Drilling and Milling Machines and Their Application".

I cannot help thinking of this as a sort of living tribute to the memory of my friend, Hans B. Kraut, whose engineering and production knowledge contributed much to this book, whose foresight and broadmindedness made its publication possible, but who—it is sad to relate—passed away in Tucson, Arizona, on Christmas night of 1947.

Despite the great contributions made by Hans Kraut, he would not allow his associates at Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., to dedicate the book to him. He insisted that credit should go to his organization as a whole, and to the industrial division of Cramer-Krasselt Co., Milwaukee, which organized the material and built the book.

Now that I have paid that much-deserved tribute to the late Hans Kraut, I want to pay an equally well-deserved tribute to "Horizontal Boring, Drilling and Milling Machines and Their Application" as a textbook in the best traditions of mutual helpfulness which long have marked the American machine tool industry as unique in a highly competitive world. What I am getting at is that this is a book which will help thousands of users of every variety of horizontal boring, drilling and milling (and as Hans Kraut used to say "—and tapping") machines, to get the most out of these machines.

From James Watt to Jet Propulsion

The horizontal boring mill, as it commonly is called, not only is the oldest type of machine tool worthy of that name, but in its modern form it is the most versatile of all machine tools and has the widest range of size and variety of work. Its beginnings as a real machine tool go back to the days when John Wilkinson of Bersham, England, developed his machine with outboard supported boring bar, which "licked" James Watt's formerly insurmountable problem of boring large steam engine cylinders. That was in 1774.

In the 174 years since that time these machines have played important roles in the development of practically every type of machine both large and small, just as they are today in the field of diesel engines, jet propulsion units, gas turbines, etc. In the meantime these machines themselves have developed far beyond anything dreamed of by John Wilkinson —both in size and variety—and they have at the same time inspired the development of a wide variety of tools, attachments and accessories which serve to make the modern horizontal "a complete machine shop in itself", whether on production work, small run work, tool work or repair work.

To drive home the capabilities of these machines, the Gidding & Lewis people have built their textbook as a ring book divided into four main sections. These are entitled "Machine Fundamentals", "Basic Operations", "Work Methods", and "Outstanding Applications". New sheets and possibly new sections, will be supplied from time to time as new phases develop.

The first section has nine chapters, the second sixteen, the third six, and the fourth will be built out of case history sheets which will be mailed out for insertion as fast as they are compiled. As a matter of fact, a great deal of the text is based on case histories and so also are many of the 323 illustrations in the main part of the book. This job of illustrating, both by photographs and diagrams, is remarkable.

It would be possible to go on and on detailing hundreds of interesting, unusual and useful machining techniques described and illustrated. I know—having read the book from cover to cover—that it is a tremendous $5.00 worth (postpaid) to all who are seriously interested in getting 100 per cent performance out of horizontal boring machines.

Principles of Modern Heat Treating

By R. M. DYKE

Growing importance of understanding exactly what happens within steels during heat treatment is emphasized as more and more complicated alloys and new operations make their appearance. In this discussion of fundamentals, the author presents facts every heat treater should know to meet the demands of modern practice

Fig. 1—Batch of worm shafts after quenching in oil, employing a Super Cyclone fixture, by Lindberg Engineering Co.

WITH continued advances being made in steels and their heat treatment, the growing importance to men in the shop, of understanding the actual transformations taking place within the steel during heat treatments, will be evident. Newer operations of martempering and austempering, for example, also the greater emphasis now being placed on physical properties in the specification of engineering steels demand this type of basic knowledge.

Although in practical applications heat treatment of tools is usually the best known, heat treatments applied to machine members are of equally great importance. In modern machine design where reduced weight and compactness coupled with high strength, are demanded, heat treatment is necessary to achieve these results, by increasing tensile strength and improving other physical properties as desired. The extensive use of alloy steels for machine members also makes their heat treatment imperative to obtain the maximum benefits available from these steels.

Heat treatment in general, therefore, is closely linked with the various types of alloy steels. Among the advantages offered by different steels, the following outstanding characteristics are available: Increased tensile strength, increased wear and shock resistance or "toughness"; greatly improved hardenability, and making oil quenching possible in most cases, with consequent reduction of distortion and fracture; improved ductility at lowered temperatures; finer grain size in carburizing; greater heat resistance at elevated temperatures, and other improved physical properties. For tools as well as machine components, the particular characteristics required may be obtained by proper steel selection and its correct heat treatment.

Critical Temperatures—The so-called critical points in steel heat treatments are the temperatures at which very marked internal changes or transformations take place in steel during heating or cooling. These critical points depend on the carbon content of the steel, and to a certain extent on the alloy content. To achieve best results, the critical points for any particular steel must be known.

Transformations produce different grain structures, composed of one or more so-called constituents. It is possible, of course, to have several constituents present in the steel at the same time, although one of them will predominate according to the heat treatment which has been given, such as hardening or annealing, for example. They are all microconstituents, since considerable magnification is required to detect the grains composing them.

Steel of about 0.83 per cent (0.80 to 0.85 per cent)

carbon content is designated as eutectoid steel, an important term in this discussion, which will be defined more fully later. A hypoeutectoid steel has less carbon than the eutectoid analysis, and hypereutectoid has greater carbon content. Carbon steel in itself may be termed an alloy, being in effect an alloy of iron and carbon.

Pearlite—When eutectoid steel is in the annealed condition, and at normal temperatures, its structure is pearlite, Fig. 2. This structure consists of alternate layers or plates of ferrite, or alpha iron, which is nearly pure iron, and iron carbide, also known as cementite. The latter is expressed as Fe_3C, and contains 93.3 per cent ferrite and 6.7 per cent carbon by weight. Carbon content in steel is always in this cementite, only, and the total carbon for the steel as a whole would seldom exceed 1.7 per cent. Cementite is a hard and brittle chemical compound, of crystalline nature, and appears to cement the grains together when appearing at the grain boundaries.

Pearlite may therefore be considered as a complex mechanical mixture, and not as a chemical compound. Its name is derived from its appearance under the microscope when properly prepared and etched. In hypoeutectoid steel in the annealed condition, there will also be free ferrite present in addition to the pearlite. That is, free ferrite crystals will exist. In hypereutectoid steel, on the other hand, there will be additional cementite present, and no free ferrite.

Ferrite itself contains practically no carbon (the maximum being 0.01 per cent at room temperature), but may contain phosphorus, silicon, nickel, etc. Grains of ferrite may occur in a free state as a separate constituent, Fig. 3, also in the pearlite as mentioned above, and in combined form with the cementite. In the latter case it loses its identity, being chemically combined with ferrite.

Austenite—As the temperature of the steel gradually rises in heating for hardening, at a certain point the iron carbide begins to dissolve in the iron, the pearlite now transforming into a much different solid structure known as austenite. The point at which this transformation begins is designated as the lower critical point, which is very near 1333° F for carbon steels. Austenite is a very important "phase" in steel, a phase being defined as a completely homogeneous section or part of an alloy. The term is not synonymous with constituent. Pearlite, for example, is a structure consisting of the two constituents ferrite and cementite, and is therefore not truly a phase.

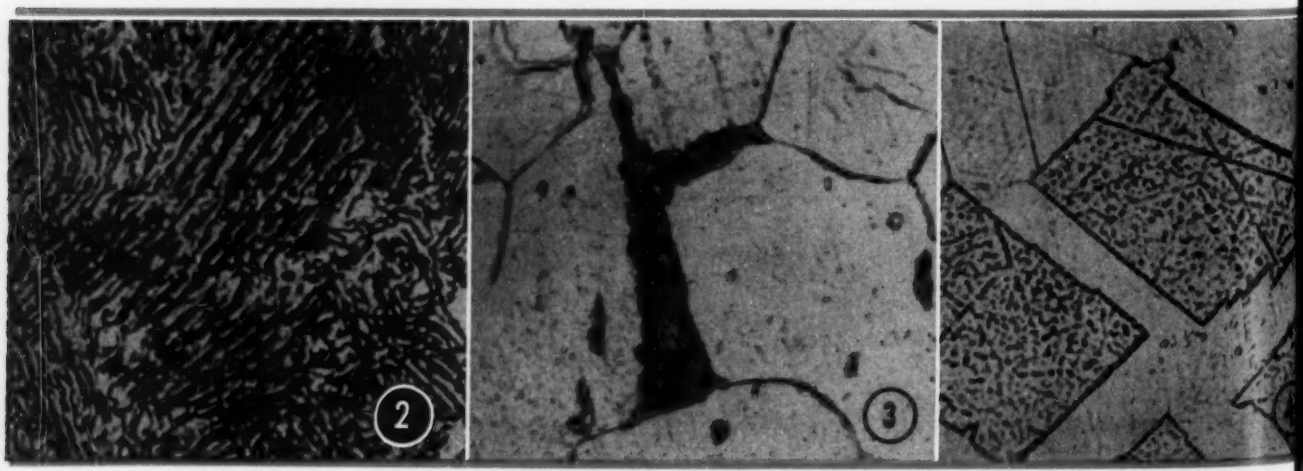
When all the carbon (or nearly all, depending on carbon content) has been dissolved in the iron, the austenite structure is completed, and the carbon (iron carbide) is said to be in solid solution. This action is completed at the so-called upper critical point, which corresponds nearly with the quenching temperature, the latter being only slightly higher. Further details regarding critical points will be considered later in connection with the iron-iron carbide diagram.

Solid solutions in metals occur in much the same manner as any common liquid solution. Austenite is only slightly magnetic, being paramagnetic, and appears as in Fig. 4. The iron of austenite is therefore much different physically from ferrite or alpha iron, and is designated also as gamma iron. It cannot exist at room temperature, unless sufficient manganese or nickel is added, as with the nickel in austenitic stainless steels.

To harden steel properly, it is necessary first to transform the pearlite almost completely to austenite before quenching. In the austenite phase, the iron carbide becomes finely distributed throughout the steel in a homogeneous solution, this condition being a prerequisite to hardening.

Returning for a moment to the lower critical point during the heating cycle, it would be noted that at this exact temperature a slight but sudden drop in the temperature of the steel occurs, even though the furnace heat is still rising. This heat is consumed in the form of energy as the molecules in the steel begin to rearrange themselves to form the new austenite constituent. This lower critical point is also known as the decalescence point.

If steel in the fully austenite condition is slowly cooled, the reverse action takes place, that is, as this temperature or lower critical point is again



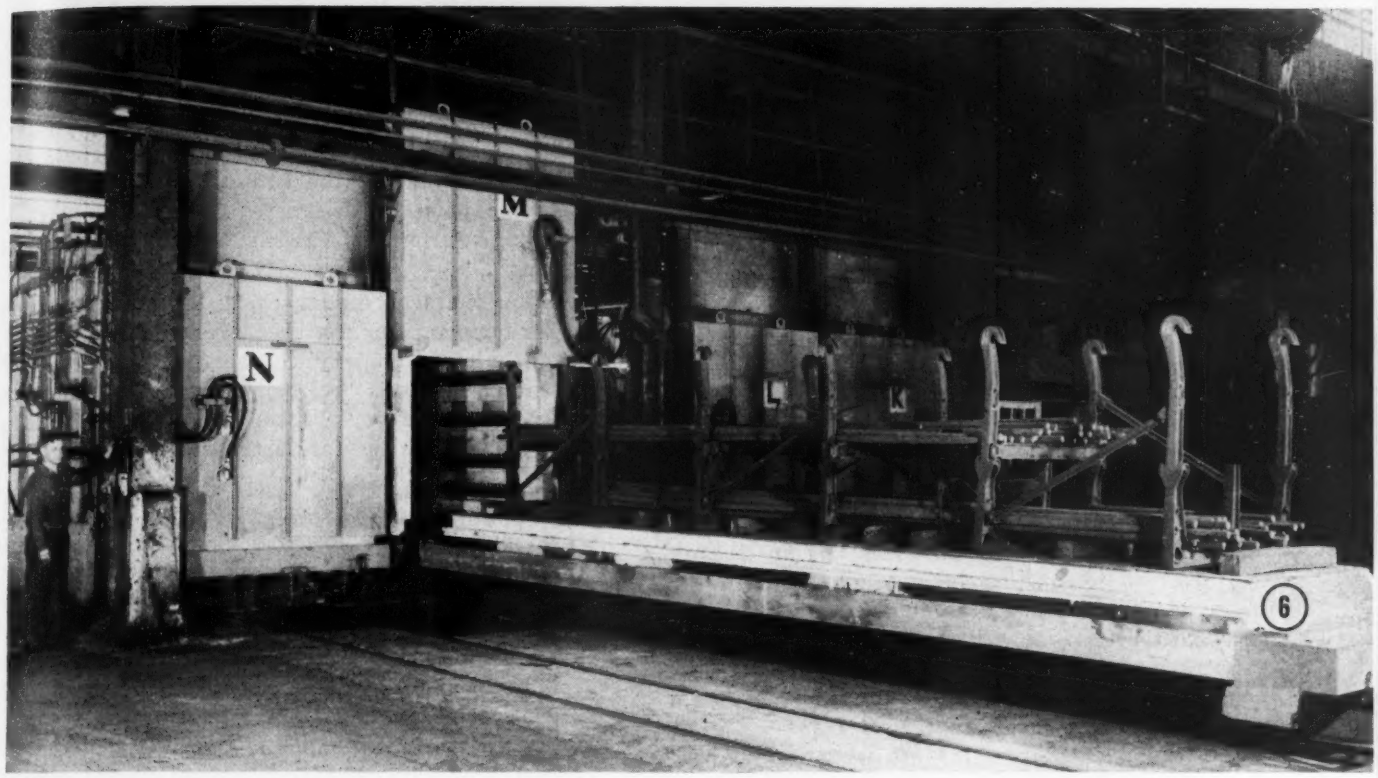


Fig. 6—Bars loaded, ready for tempering in car-bottom furnace, at the Bethlehem, Pa., plant, Bethlehem Steel Co.

reached, this time on the downward cycle, the iron carbide begins to pass out of the solid solution, the structure reverting to pearlite, and there now is a sudden slight rise in temperature, instead of a drop. This is due to the fact that energy is now being released in the form of heat—as it was previously absorbed. In this case the action is known as recalescence. This temperature is slightly lower than at decalescence, as some lag occurs. Continuation of the slow cooling would again produce the original pearlite structure.

Martensite—Heating to achieve the austenite constituent, and then cooling suddenly to room temperature, by quenching in a suitable medium, prevents the usual transformation back to pearlite, as would occur if the steel was cooled slowly. Instead, a different constituent, martensite, is formed. This is steel in its hardest condition, and under the microscope it presents the characteristic needle-like structure, Fig. 5. It is very brittle and unstable, deformation or cracks may develop or continue, which necessitates tempering, or drawing.

Troostite—To reduce brittleness and relieve internal stresses, the martensite must undergo tempering or drawing by reheating it to a suitable temperature below the lower critical point. In the case of carbon steels, it means reheating to from 400 to 750 or 800°, producing troostite, also designated as temper troostite, Fig. 7. This constituent is much tougher and more stable, but less hard, than martensite. Cooling from here back to room temperature will retain this structure, and it is during this tempering stage, of course, that the desired hardness is determined.

Sorbite—Carrying the tempering process still farther, in the range of 750 to 1100° F for carbon steels results in the sorbite structure, which is really a medium fine pearlite, see Fig. 8. Hardness is now further reduced, but the ductility is improved. This tempering treatment is applied more often to machine parts, whereas in the manufacture of cutting tools, troostite is usually the final condition of the steel.

Continued heating from the sorbite condition would cause pearlite to form again, as annealing would begin, the steel losing most of its hardness. Sorbite

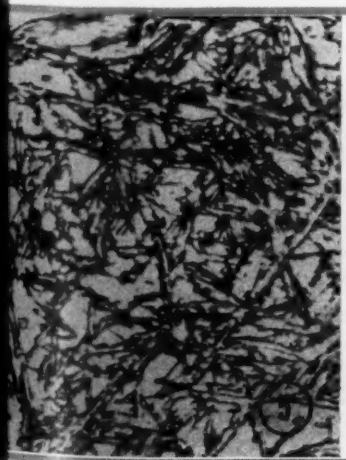


Fig. 2—Pearlite structure in eutectoid steel, showing alternate platelets of ferrite and cementite. 1000*X*

Fig. 3—Hypoeutectoid steel. Ferrite (white) exceeds pearlite (dark). 1000*X*

Fig. 4—Austenite structure as retained in SAE 30905 steel, 18 per cent chromium, 8 per cent nickel. 1000*X*

Fig. 5—Martensite constituent in hypereutectoid steel 1000*X*

combines considerable "toughness" or shock resistance, with a fair degree of hardness.

Spheroidite—Spheroidizing, an operation which is intermediate between tempering and annealing, is performed with the object of improving machinability of steel. Usually it is accomplished by prolonged heating just under the lower critical point, and followed by a relatively slow cooling. The free or excess cementite in hypereutectoid steel, also the hard cementite plates in pearlite, are hereby changed to a globular or spheroidal form, spheroidite. These carbide particles are better adapted to chip reduction in machining, Fig. 9.

Iron-Carbon Diagram—The iron-carbon diagram, more correctly known as the iron-iron-carbide constitution diagram, has considerable value in the study of critical points. Diagram under discussion applies to carbon steels only, and indicates their critical points for quenching purposes, also the constituents which are present at varying temperatures.

It must be emphasized that the diagram shows the transformations taking place during slow heating only (or slow cooling). Another diagram will be introduced later to indicate transformations and constituents during rapid cooling, namely quenching.

The constitution diagram serves several purposes, and in its original or true function only the phases would be shown, and not the structures. It is also known as an equilibrium diagram, which then primarily indicates the transformations and resultant phases in slow cooling of the molten metal (not considered here), down to the solidified steel at normal temperature. The one employed here is a modified diagram with additional heat treatment temperature ranges for annealing, quenching, etc. also indicated, Fig. 10. If the diagram were extended to its full dimensions, we would arrive at cast irons toward the right, and at molten metal toward the top, neither of which concerns us in the heat treatment of steels. The irons shown toward the left are in the same category.

Critical Points—Carbon content is indicated horizontally, and temperature vertically. The critical points are here designated by the letter A with suffixes, instead of by name, this being more convenient practice. A is derived from the French word "arret", meaning arrest or stop, since the slow heating or slow cooling, as the case may be, is interrupted or arrested at the critical points. The lower critical point during the heating cycle, or the decalescence point, is designated as the Ac_1 point, c being taken from the French "chauffage", meaning "to heat".

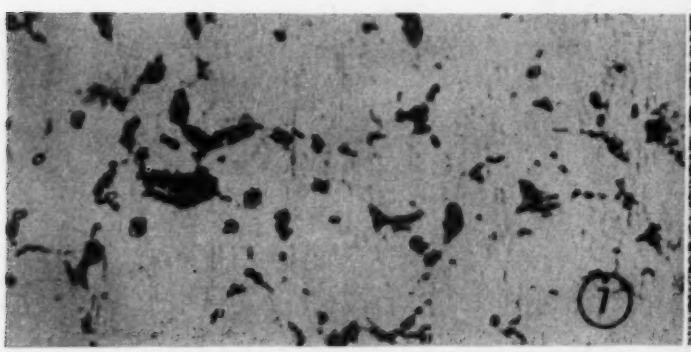
During the slow cooling cycle, the transformation at this temperature, now recalescence, takes place at a slightly lower temperature, the Ar_1 point, the letter r from the French "refroidissement", meaning "to cool". (As a memory aid, the c may be regarded as in "climbing temperature", and r as in "receding temperature".)

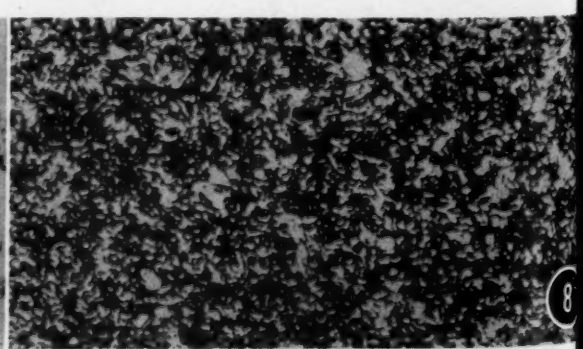
For each Ac point, there should be an Ar point shown at a slightly lower temperature. These are usually omitted in the diagram, since they are not of great importance in steel heat treatment. Only the lower or Ar_1 point is shown in this case. When either of the suffixes c and r is omitted, it is taken for granted that an Ac point is meant. The lower critical, or A_1, is the most important, and is generally meant when no further designation is given. If cooling were possible at a slow enough rate, then the Ac and Ar points would coincide. In rapid heating, the A points would assume values differing from those given.

By taking one composition at a time, and tracing it through the slow heating cycle on the diagram, it will help to explain the whole diagram more fully. We will take a hypoeutectoid steel of 0.40 per cent carbon, which would be a medium carbon steel. At normal temperatures, it would consist of pearlite as well as excess or free ferrite, as previously stated.

Austenite Forms—As the Ac_1 point is reached during heating, the first and major transformation begins, namely, the solid solution, or austenite begins to form. The iron carbide dissolves in the iron, now known as gamma iron. At 1420° F, at the Ac_2, it becomes almost entirely nonmagnetic. Heating to the Ac_3, or simply A_3 line, completes the solution of carbide in gamma iron.

With increased carbon content, toward the position S, the A_3 and the A_2, or magnetic point, coincide. A eutectoid steel of 0.83 per cent carbon (or 0.80 per cent carbon if a pure iron-carbon alloy) trans-





forms at the common A_1 point, the 1333° F line, the magnetic change or A_2 now taking place at the same temperature, resulting in only one critical point.

Hypereutectoid Steels—In the hypereutectoid steels, we have a different set of conditions, because we start with pearlite plus excess cementite, and not excess ferrite. The first three critical points are merged into one, forming the Ac_{123} line, which includes the magnetic (A_2) line. An additional critical point, which forms the Acm line, denotes the temperature to be reached at which this excess cementite is completely dissolved.

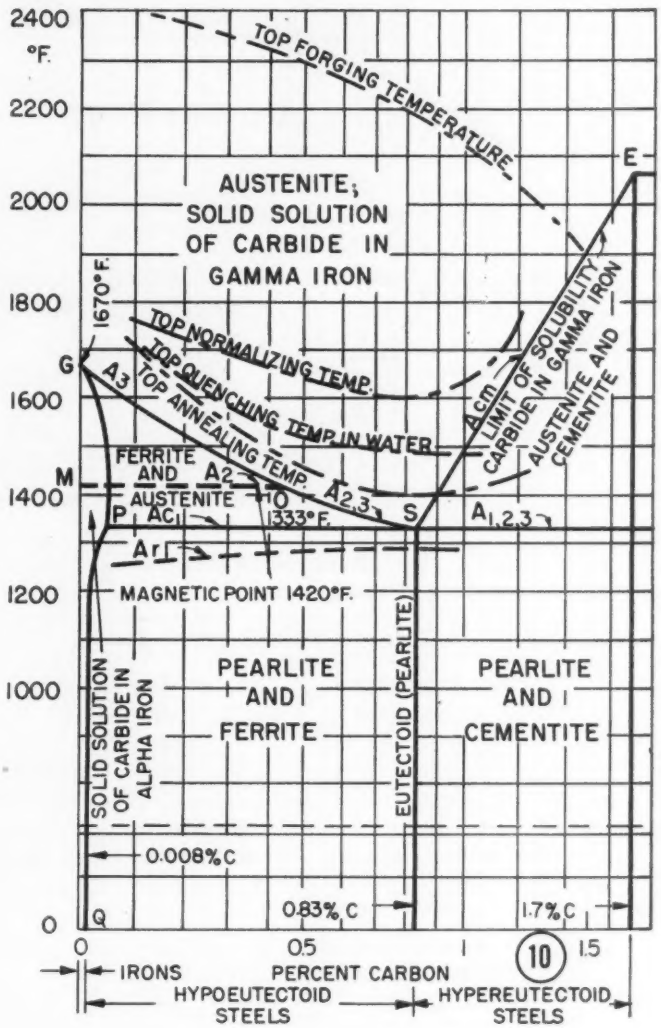
These steels would have to be heated above the Acm line before quenching. However, since this temperature becomes quite high, so that quenching from here would result in coarse grain structures, some suitable temperature between the Ac_{123} and the Acm lines is selected, depending on the final properties desired. This leaves some undissolved cementite, or iron carbide, in the austenite.

The GS line, beginning with A_3 on the left, is primarily a ferrite (or ferrite solubility) curve, and therefore does not continue on line SE, as might be supposed, the latter being the Acm line; it concerns the free cementite only.

Summing up briefly, the GS line represents the additional heating or higher temperature above Ac_1 which is required to dissolve the excess ferrite. The Acm line represents the additional or higher temperature which is required to dissolve all of the excess cementite. Since eutectoid steel has no excess ferrite or cementite, the two lines GS and SE must converge at S. Some time, however, must of course elapse to complete the solid solution of the eutectoid composition, above the A_1 point, but the time element cannot be shown on this type of diagram.

With regard to the additional temperature ranges which have been added to the diagram, it should be noted that they represent top temperatures in each case. The top quenching temperature (in water) is considered the maximum, and need not be reached in all quenching applications. Excessive temperatures, of course, encourage coarse grain structures.

Interrupted Quenching—To overcome the disadvantages of the usual quench-and-temper operation, newer quenching methods have been evolved. The



general principle of the common "interrupted" or "timed" quench, where the tool or part is first given a very short, rapid quench and then transferred to a slower quenching medium, is familiar to all heat treaters, and has been used for some time. Investigations of recent years have resulted in superior methods for interrupted quenching, so that accurate control can be exercised over the operation, and better results achieved in many applications.

In quenching for hardening, martensite does not begin to form until about 400° F in the case of carbon steels. This is known as the Ms point (marten-

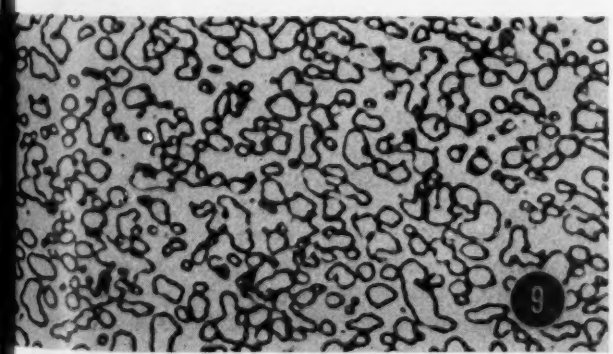


Fig. 7—Troostite (dark) in quenched eutectoid steel. 1000X

Fig. 8—Sorbite structure shown in hypoeutectoid steel. 1000X

Fig. 9—Spheroidized condition of hypereutectoid steel. 1000X. Photomicrographs courtesey Bethlehem Steel Co.

Fig. 10—Iron-carbon constitution diagram, indicating critical points and resulting structures during slow heating or slow cooling. Adapted from Bethlehem Steel Co. iron-carbon diagrams

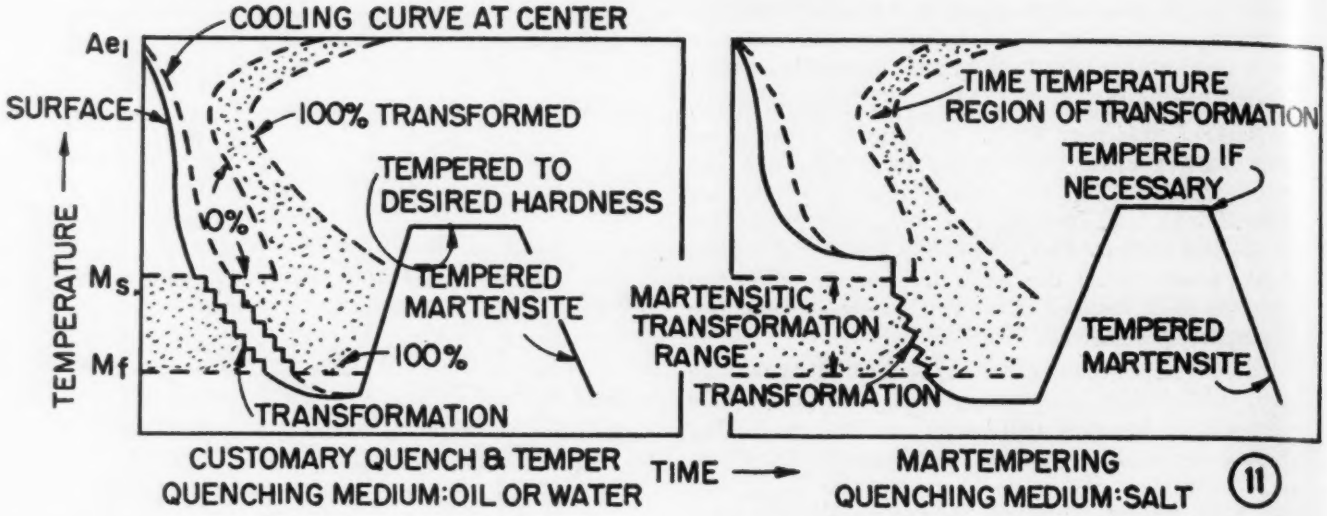


Fig. 11—Comparison of ordinary quenching and martempering. Courtesy American Society for Metals

site "starts"), the temperature varying also, depending on carbon and alloy content, as will be discussed later. The completion of this transformation is at the Mf point (martensite "finished").

To obtain maximum hardness, or complete transformation to martensite, a carbon steel of 0.83 per cent C, for example, must be quenched from above the A_1 down through the first 500 degrees (approximately) within 1 second, and to the Ms point in only a few seconds more. Some additional time is required, however, to complete the transformation from here, while the cooling continues. This is the critical cooling rate for this steel, and if slower, then other constituents will be formed in addition to the martensite.

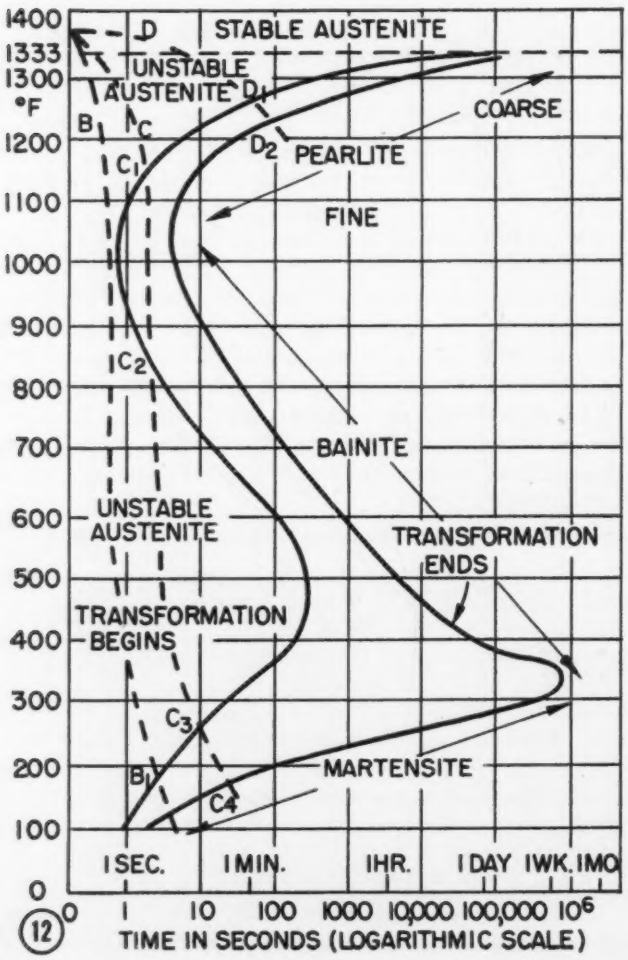


Fig. 12—S-curves for eutectoid carbon steel. Two illustrative quenching curves, B and C, and a slower cooling curve, D, also indicated. Adapted from U. S. Steel Corp. S-curve diagrams

Since this is a drop of almost 1000° F in such a short time interval, the effects on the steel can be imagined. In large sections especially, the outside will cool and transform much more rapidly than the inside, which will continue transforming after the outer shell has already hardened to martensite.

Coupled with this is the fact that martensite expands, which results in high locked-in stresses, resulting in distortion and sometimes fracture or microscopic cracks. Machine parts or tools of uneven section will cool and transform at different rates where the shape varies appreciably, and this aggravates the above conditions.

Martempering—This is a form of interrupted quench designed to overcome these difficulties. The steel is first quenched in a hot salt bath, maintained at a temperature which is just above the Ms point, usually 400 to 450° F. It is allowed to remain in the bath until the temperature has been equalized throughout the section. At this stage, martensite will not form, the structure still being "unstable" austenite. This is followed by cooling in air, during which stage martensite will form almost with entire uniformity throughout the section, resulting in very low residual strains. The operation is completed by conventional tempering.

Salt baths have been developed which maintain the critical cooling rate, if kept at constant temperature and agitated. Their quenching rate is comparable to the usual oil quench. Quenching too slowly to the holding temperature would defeat the purpose of martempering. A recent development, martempering is the result of investigations by B. F. Shepherd, first made known in 1943.

This process is especially useful for components

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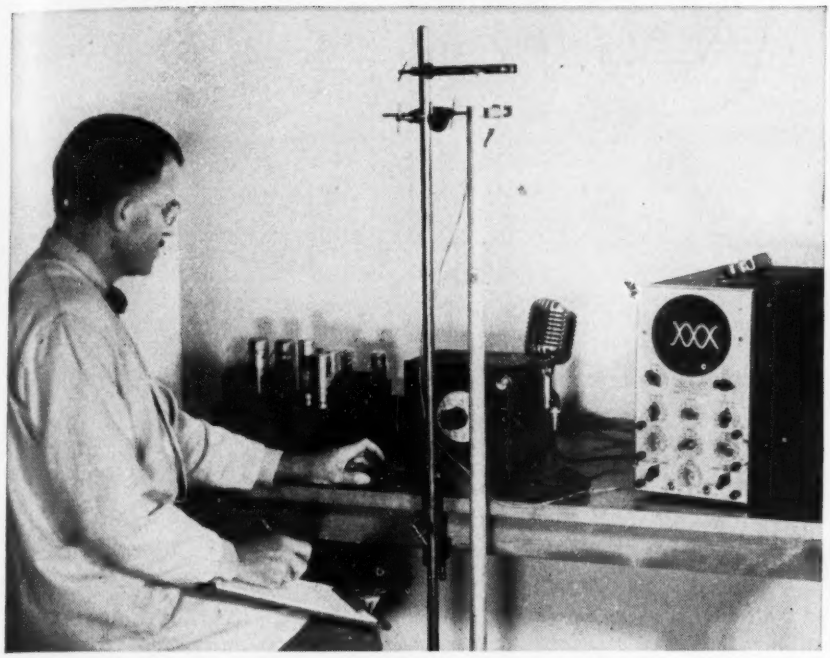

Laboratory set-up for measuring tone of chime tubes. Lissajous figure on screen of cathode ray oscilloscope is being used to determine the frequency (cycles per second) of the chime's fundamental note.

Revere Tubes make Good Music

BECAUSE of the importance of the market for brass tube used in door chimes, Revere some time ago embarked upon a complete scientific study of the musical qualities of such tube, to determine the factors responsible for pleasing tone. Here is a brief report of the work, which offers an example of the thoroughness with which Revere attacks problems concerning the application of its mill products.

The first step was purely experimental. We proceeded by ear. Over 100 samples of tubes in various alloys, tempers and gauges were hung up, struck, listened to, and preferences obtained from many people. These tests indicated not only what was the best alloy, but also what were the proper temper and wall thickness requirements to produce the most acceptable and desirable tone. But Revere did not stop there. It was desirable to know what made that tone preferable, what were the factors that influenced it, and how they could be controlled. It was felt that only with such complete information in hand could Revere be in position to control chime tube quality accurately, and fill customers' orders reliably with a standard product.

The project then was turned over to a laboratory physicist who is also a talented musician. Here began the most ambitious and lengthy and scientific part of the work, employing the most modern electronic apparatus, including a beat-frequency oscillator and a cathode ray oscilloscope. These made it possible to dissect the tone produced, measuring the frequency and intensity of the fundamental note and its partials with an accuracy of one cycle per second. Much new information was uncovered. For example, the strike tone so clearly heard when the chime is struck does not actually exist in the tube, but is a difference tone between the 1st and 3rd partials. Hence, for good tone, those partials must be equal in intensity and duration.

It requires seven closely-typed pages just to sum up the work in general terms; the laboratory records fill a large volume. The net of it is that Revere really knows about all there is to know about chime tube, scientifically, musically, physically, and, of course, how to produce it. If you need such tube, come to Revere.

Perhaps you use brass tube not for its sound, but for its corrosion resistance, strength, machinability, the polish it takes, the ease with which it can be bent, soldered, brazed, plated. Revere also knows how to control the factors influencing such applications, so come to Revere for brass tube for any purpose.

Revere also makes other types of tube, including copper water tube, condenser tube in such alloys as Admiralty, Muntz, cupro-nickel, tube in aluminum and magnesium alloys, lockseam tube in copper alloys and steel, and electric welded steel tube. Many of these can be had not only round, but also square, rectangular, oval, and in various flutings and special shapes. The Revere tube line therefore is complete, and awaits your orders.

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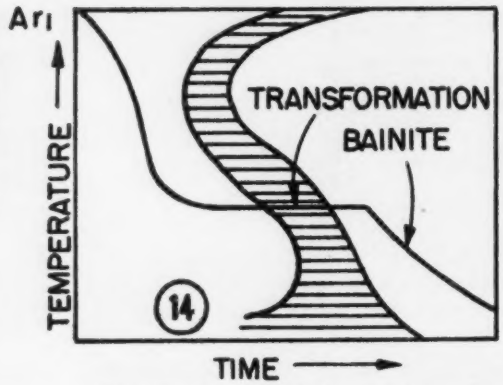

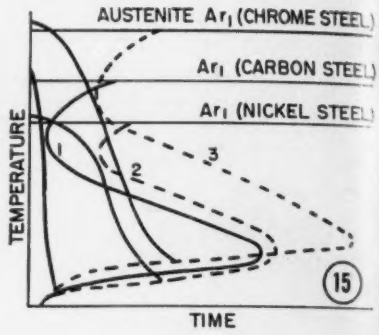

Fig. 13—Lower bainite structure of austempering. 5000X. Courtesy U. S. Steel Corp.

Fig. 14—In austempering, hardening and tempering are combined in the same operation

Fig. 15—Comparison of S-curves, Ar_1 points, and quenching curves of three steels, plain carbon and medium alloy. After A. A. Bates, in Ferrous Metallurgy, by E. J. Teichert

which must be finish-machined before hardening, and where distortion must be held to a very minimum. It is capable of application to carbon as well as low alloy steels which are hardenable by ordinary methods. Springs, alloy steel gears and chisels, spring collets, are among common applications.

Martempering of a much larger component than is common, is reported in the July, 1947 issue of *The Houghton Line*. Herringbone gears of 24-inch diameter, with 4 inch face, of a "good grade of straight hardening steel" were treated with greatly improved results over previous methods. Special equipment for martempering large parts was emphasized.

Entire process took 7 minutes, as follows: "Flame heated, quenched in hot salt at 400° F" (special spray quench). "Physical change or distortion maximum 0.010-inch." Drawing in this case was not necessary, and the hardness obtained was equal to or better than with the usual oil quench.

Martempering is compared with ordinary hardening in the diagrams of Fig. 11.

"S-Curve"—The "S-curve" is also known as the TTT curve, for time, temperature and transformation. It indicates the structures which are formed when steel is quenched to any selected temperature within a certain time interval, and held at that constant temperature until a desired structure is completed, as in "austempering". The actual time required for this is also given, being represented by the horizontal distance between the left and right curves at the selected temperature, Fig. 12.

Certain critical points encountered during quenching are also shown. It will be noted that time on a logarithmic scale is given on the horizontal ordinate, due to the considerable length of time required for some transformations, as will be evident later. It must be emphasized that fast cooling rates are represented here primarily, and the constituents and diagram itself therefore differ from conditions in the iron-carbon diagram. That is the reason we find austenite below the A_1 line; now as unstable austenite, being shown to the left of the curves, and down to that part of the curve where martensite forms.

The left S-curve indicates the beginning of any transformation, the right curve marking its completion. Constituents formed will be found to the right of the curves.

We will consider what happens in ordinary quenching first. At certain temperatures during quenching or rapid cooling, transformations tend to take place very quickly. At about 1050° F, at the nose of the left S-curve, pearlite tends to form very rapidly from the austenite, unless the critical cooling rate is maintained. As can be seen, the steel must be quenched past this point in about 1 second or less, if a complete martensitic structure is required. In a fast water quench, as with the rapid cooling curve B, Fig. 12, nose of the curve is missed in the 1-second interval at this point, and as the cooling continues, transformation to martensite begins at B_1 and is completed in a few seconds more.

With the slower quench represented by curve C, the nose is not missed and a transformation begins at C_1, forming some pearlite. Rapid cooling being continued, however, this transformation is only about half completed in this case, stopping at C_2, and the remaining austenite begins to transform to martensite at C_3, and completes at C_4. The structure will now be partly martensite and the remainder a fine pearlite. This pearlite, however, differs from that obtained in slow cooling, also being much harder.

Principle of the ordinary interrupted quench, as mentioned in the introduction to martempering, will now be obvious. First, we quench or cool rapidly to get past the 1050° F point (the "nose") in about 1 second, then transferring to a slower medium, which still permits the martensite to form.

Cooling curve D is not really a quenching curve, being too slow, but would be a normalizing operation, or slow cooling in air. Here the austenite begins to transform to pearlite at D_1 in 1 minute and completes at D_2, and no martensite is formed.

The S-curve varies with carbon and alloy content, and was originally based on findings in quenching

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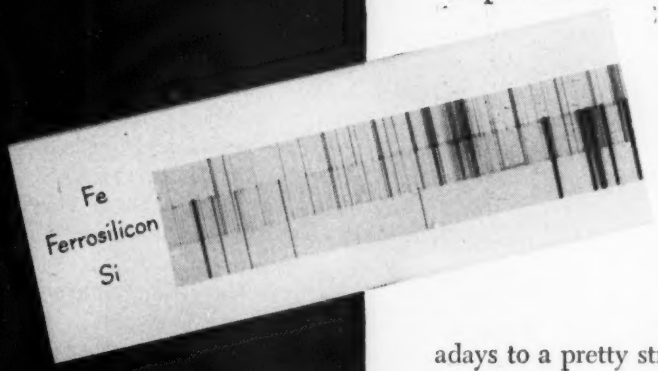

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and holding small specimens at constant temperatures. Constituents formed increase in hardness toward the bottom of the diagram, also forming intermediate structures where they merge on the diagram, there being no sharp dividing line.

Austempering and the S-curve — If, instead of quenching at a progressive rate, we quench down to a certain temperature above the martensite formation point, to 700° F for instance, and hold for a sufficient time at this constant temperature, until the right-hand S-curve has been passed, then complete transformation to the structures toward the right will be accomplished.

In austempering, another form of interrupted quench, hardening and tempering are, in effect, combined in one operation. The work is quenched in a hot salt bath or lead bath, usually between 400 and 800° F, depending on final physical properties desired, held for the required time for transformation, and cooled in air.

This forms a new constituent known as bainite, Fig. 13, which is intermediate in physical properties between martensite and temper troostite, and has much greater toughness and ductility than is obtained by the usual quench and temper method. It also avoids microscopic cracks which may be present in tempered martensite. This is also illustrated by the austemper cooling curve of Fig. 14.

It must be remembered that bainite cannot be produced by a direct quench to near room temperature, but must be obtained by holding at a constant higher temperature. It may be achieved in the temperature range between 950 and 300° F, with resulting degrees of hardness ranging from about 40 to 55 rockwell C. Upper and lower bainite and intermediate structures are produced. It will be observed that at the lower temperature ranges, complete transformation at constant holding temperature would require considerable time.

The S-curve as well as the austempering procedure for the formation of bainite was first developed by E. S. Davenport and E. C. Bain. This constituent is named in honor of Dr. Bain, of United States Steel Corp., the latter owing the patent rights to this process. The technique is best adapted to small parts, especially for carbon steels of 0.60 to 1.20 per cent carbon. Some common applications are wire, springs, and pneumatic chisels. Martempering, on the other hand, is designed for larger sections.

Isothermal Quenching—In isothermal quenching, as developed by H. J. Babcock, heavier components can be treated than in austempering. The holding temperature is lower. After heating to the hardening temperature in a salt bath, the first quench is in an agitated hot salt bath at 450° F or higher. The steel is held at this temperature for usual isothermal transformation, then transferred to a third salt bath for tempering, this last bath having a higher temperature than the second.

Alloys and the S-curve—The slower critical cooling rates of most alloy steels make it easier to get past the nose of the S-curve in quenching. The increased time interval available is noted by displacement of the nose of the curve toward the right, as in Fig. 15.

Advantages of the slower quenches possible from this are obvious, whether applied to interrupted quenching, hardening by common oil quench, or air quench, as the case may be. Data on Ms points of steels for use in martempering, also S-curve diagrams for heat treatments here discussed, are available from steel manufacturers.

Hardening characteristics of engineering steels in particular, are continually assuming greater significance in steel specifications and in improved heat treatments.

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Packing Handbook Dispels Hydraulic "Mysteries"

Many "mysteries" in the minds of hydraulic engineers as to proper application and use of synthetic packings will be dispelled by a reading of the new handbook entitled "Synthetic Rubber Packings" published by E. F. Houghton & Co., Philadelphia. The authors remark that while the use of synthetic rubber packings is not new, having been measurably extended as a result of increasing hydraulic controls of wartime mechanisms, there has been a real dearth of basic information published regarding proper application.

The book adequately covers the various packings used throughout industry together with their specifications and potential uses. In addition the back of the handbook carries an excellent section devoted to tables of weights and measures which should be of assitance to the design engineer.

Cement-Filled Metal Forms Cut Building Costs

Using only two types of lightweight (26 or 28-gage) interlocking metal members, to which side panels are secured by means of special metal clips, a new construction process enables unskilled workers to erect walls of steel-encased concrete framework without the use of heavy machinery. The new method, introduced by Modern-Wall Co., Osborn, O., provides a highly simplified means of pouring, at the site, a concrete wall skeleton of interlocking, cement-filled metal forms, firmly anchored between panels of standard insulating board or plywood.

In the construction of a model home, the following savings were brought about by the new process: A reduction in the cost of materials and a saving of manhours.

—o—

A proposed simplified practice recommendation for copper and copper-alloy round seamless tube was recently submitted to producers, distributors and users for approval. According to the Commodity Standards division of the National Bureau of Standards, Washington, the recommendation, proposed by the Copper and Brass Research Association, lists preferred outside diameters and wall thicknesses for copper and copper-alloy round seamless tube.

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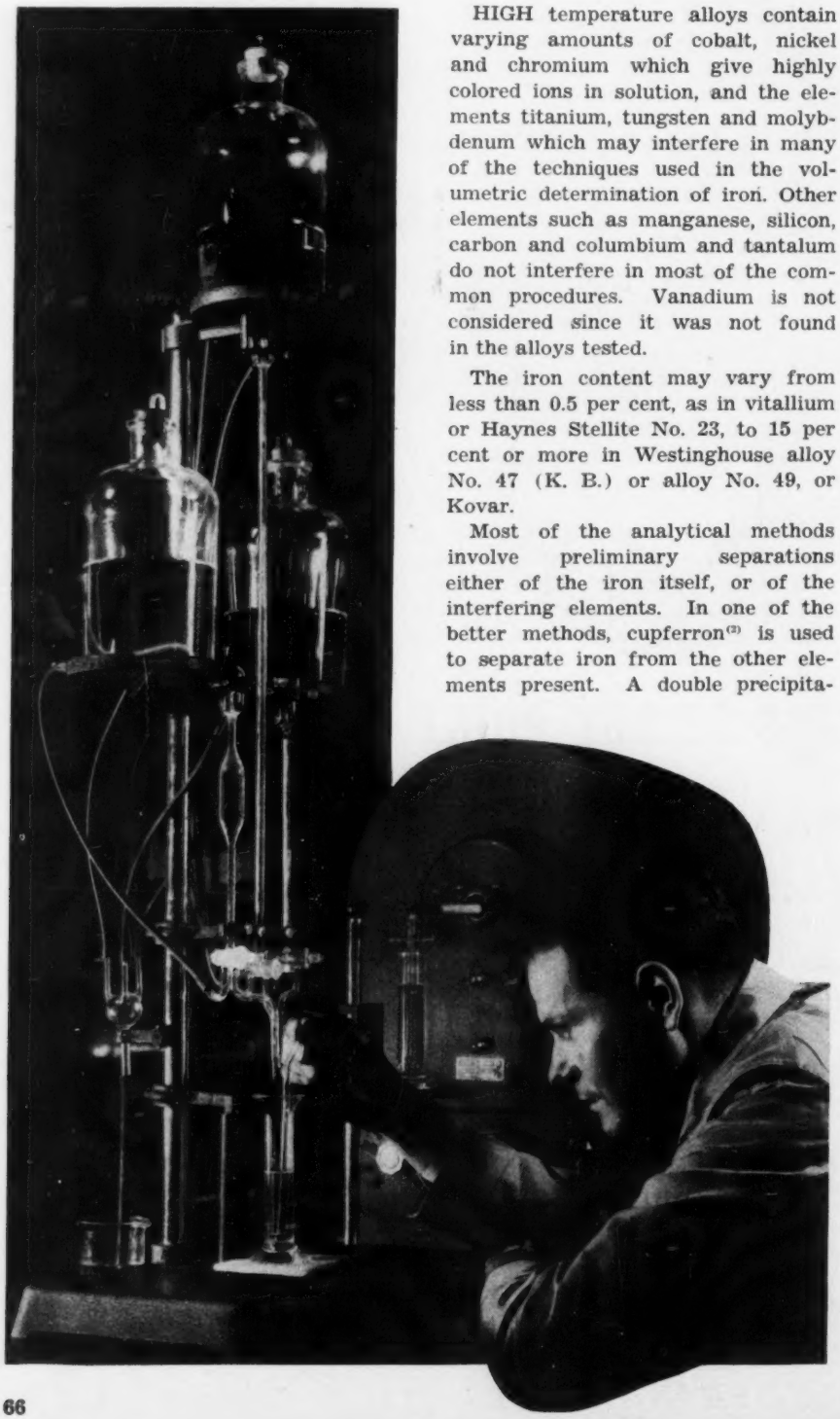
Titration of Iron in

HIGH-TEMPERATURE ALLOYS

Use of copper powder reduction method simplifies determination of iron in the presence of such elements as nickel, cobalt, chromium, tungsten, silicon, manganese and aluminum. Details of procedure for making the determination are described in accompanying article



Metals give up their secrets under the investigating eye of the chemist

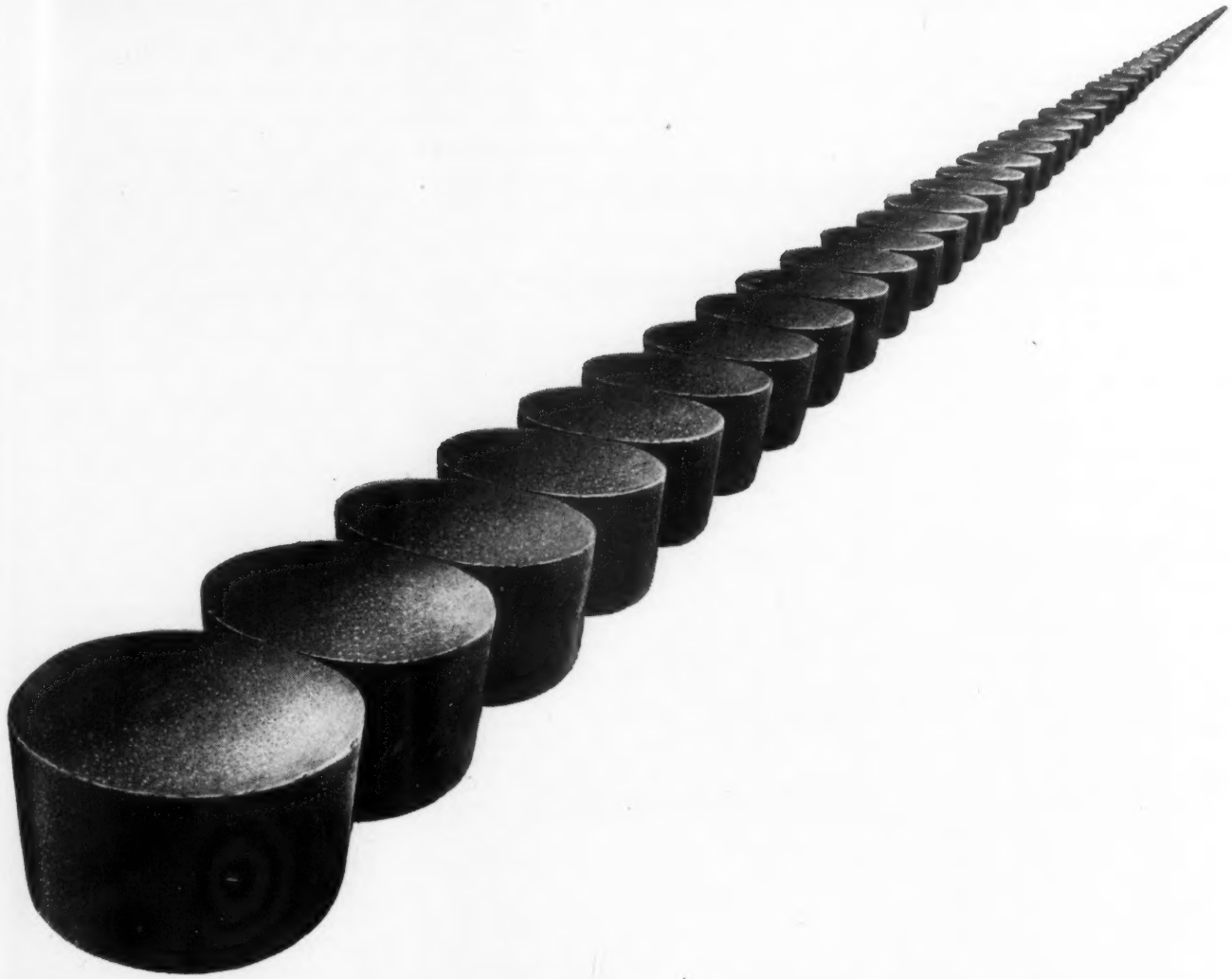
HIGH temperature alloys contain varying amounts of cobalt, nickel and chromium which give highly colored ions in solution, and the elements titanium, tungsten and molybdenum which may interfere in many of the techniques used in the volumetric determination of iron. Other elements such as manganese, silicon, carbon and columbium and tantalum do not interfere in most of the common procedures. Vanadium is not considered since it was not found in the alloys tested.

The iron content may vary from less than 0.5 per cent, as in vitallium or Haynes Stellite No. 23, to 15 per cent or more in Westinghouse alloy No. 47 (K. B.) or alloy No. 49, or Kovar.

Most of the analytical methods involve preliminary separations either of the iron itself, or of the interfering elements. In one of the better methods, cupferron[2] is used to separate iron from the other elements present. A double precipitation is usually required to free the iron of mechanically entrained molybdenum, tungsten and chromium, but titanium always remains with the iron. In this case the iron may then be separated from the titanium by hydrogen sulphide in tartrate solution, or alternatively, the iron may be selectively reduced by copper powder[4,5] and titrated in the presence of the titanium.

Hydrolytic procedures have been used, but cannot be applied to many alloys. Holt and Swalheim[1] showed that iron could not be separated from tungsten by using sodium hydroxide; iron cannot easily be freed of molybdenum by the repeated use of ammonium hydroxide; and iron can usually be found in the filtrate of an alkaline sodium chromate—aluminate solution when attempting to precipitate the iron with sodium hydroxide. Chromium could be volatilized as chromyl chloride, or separated as lead chromate; tungsten could be separated as trioxide with perchloric acid; but such methods are not easily applied when all three, along with nickel and cobalt are present. Titanium accompanies the iron.

In this paper it is shown that iron may be titrated directly after copper powder reduction[3,4,5]. The size of sample may be 1 gram, or less for higher iron content, and the elements present may be nickel, cobalt, chromium, titanium, tungsten, silicon, manganese and aluminum. It is necessary to remove molybdenum by hydrogen sulphide. Vanadium is not usually present, but, if present, will be titrated and calculated as ferrous iron. (In such event, vanadium must be determined on a separate sample, and the iron equivalent subtracted.) The end point may be de-



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*"Carbon plugs are never out-of-round and are consistently accurate in dimensions. They are structurally strong and may be handled without damage . . . can be hammered into place in the mold opening without being crushed. A large percentage may be employed a second or third time.

"Their use has eliminated 90 pct of the leakers . . . absence of leakers has reduced steel loss to a minimum and has prevented the burning of mold buggies and railroad ties and rails under the mold buggies. Reliance on the plugs has improved pouring conditions by eliminating stop-pours, skulls, sticking blackheads and other pouring difficulties.

"Carbon mold plugs do not spall. There can be no refractory absorbed into the ingot from the plug, which practically eliminates the possibility of inclusions from the mold plug. Little or no carbon pickup is noted in ingots of steels over 0.10 C.

"Elimination of burn-outs in the plug holes has improved mold life by 10 pct. There is no contamination of soaking pit bottoms if the carbon plugs adhere to the ingot bottom. As compared with any other plug of the same size, the carbon type is light and very easily stored or handled . . . a decided advantage has been gained in producing alloy steel of the best quality."

**From an article entitled, "Carbon Mold Plugs . . . In Alloy Steel Production" which appeared in the November 27, 1947, issue of* Iron Age.

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termined visually, or potentiometrically.

In the procedure, the alloy may be dissolved directly in perchloric acid (95 per cent nickel and cobalt alloys), or may first be attacked by a cold mixture of hydrochloric acid and hydrogen peroxide or by cold aqua regia, and followed by fuming in perchloric acid. In the absence of molybdenum the cold, dilute solution is reduced with copper powder, filtered and titrated. If molybdenum is present, it is separated as sulphide. Titanium, tungsten, nickel and cobalt are not reduced by copper powder[3,4,5]; iron is completely reduced to the bivalent state, any manganic manganese becomes bivalent, pentavalent vanadium becomes quadrivalent, hexavalent chromium becomes tervalent, and any molybdenum is incompletely changed from hexavalent to pentavalent.

Procedure for Determination of Iron

1. Size of sample. A 1-gram sample is weighed. If the iron content is greater than 10 per cent, a smaller sample may be used.

2. Solution of sample. Samples containing 95 per cent, or more of nickel dissolve directly by heating with 15 milliliters of 70 per cent perchloric acid; nickel-cobalt alloys, with low chromium, tungsten or molybdenum content, also dissolve directly in perchloric acid; but most other alloys must be decomposed by 25 milliliters of mixed acids (3 parts HCl, 1 part HNO_3, 4 parts H_2O). A rapid solution mix for high molybdenum or high tungsten alloys is 50 milliliters of cold hydrochloric acid plus small portions of 30 per cent peroxide; another is cold hydrochloric acid-nitric acid (2:1).

3. Procedure. Weigh the sample and transfer to a 400-milliliter beaker. Dissolve the sample with the mixed acids or the hydrochloric acid-peroxide and follow with 20 milliliters of 70 per cent perchloric acid; or, dissolve the sample directly in perchloric acid. Evaporate to heavy fumes of perchloric acid. Cool. Add 75 milliliters of water, dissolve the sample by warming and boil the solution for 5 minutes. If molybdenum is present, or likely to be present, proceed as in paragraph 3-A and 3-B which follow; if molybdenum is certain to be absent, omit paragraph 3-A.

3-A. Bubble a rapid stream of hydrogen sulphide into the hot solution for 10 minutes, add 100 milliliters of water and continue the gassing for another 5 minutes. Cool the solution in a cold water bath, stir in paper pulp and filter through a 12.5 centimeter No. 40 Whatman paper, containing paper pulp, into a 600 milliliter beaker. Wash the beaker and paper with a cold solution of (1:99) sulphuric acid, saturated with hydrogen sulphide, then discard the paper. Evaporate the filtrate to 75 milliliters. If a precipitate of molybdenum sulphide appears in the beaker, filter it off and wash the paper with (1:99) cold sulphuric acid solution. Complete, according to paragraph 3-B.

3-B. Cool the solution and drop in 5 per cent potassium permanganate solution, until a permanent pink color is obtained.

Add 10 milliliters of (1:1) sulphuric acid to the molybdenum-free solution, and cool to 10 degrees Cent. Add about 0.75-gram of copper powder reagent and stir for 5 to 8 minutes. Filter the solution through a 12.5 centimeter No. 40 Whatman paper into a 600-milliliter beaker. Wash the beaker with cold water, and carefully wash the paper so that the copper powder does not creep above the paper. Discard the paper. To the filtrate add 200 milliliters of water, 5 milliliters of glacial phosphoric acid and 10 milliliters of (1:1) sulphuric acid.* Cool the solution to 10 degrees Cent and titrate visually with 0.1-N $KMnO_4$, or potentiometrically with 0.1-N $KMnO_4$ or $K_2Cr_2O_7$. The blank for visual titration is 0.05 or 0.10-milliliter. It is well to have an untitrated sample alongside, to note the first darkening of the solution.

Calculation:

$$\% \text{ Fe} = \frac{P \times N \times F \times 100\%}{W}$$

Where:
P = Milliliters of $KMnO_4$
N = Normality of $KMnO_4$
F = 0.05584
W = Weight of sample in grams

Example: Titration of 3.7 milliliters, 0.101-N $KMnO_4$, 1-gram

$$\% \text{ Fe} = \frac{3.7 \times 0.101 \times 0.05584 \times 100\%}{1}$$

% Fe = 2.08 per cent

* If the alloy is high in cobalt the solution will have a reddish tinge. Add 10 to 30 milliliters of a 10 per cent nickel sulphate solution until a greenish cast is obtained.

EFFECT OF MOLYBDENUM ON THE DETERMINATION OF IRON IN ALLOYS

Sample No.	Apparent %, Fe (Mo present)	Correct %, Fe (Mo removed)
1	4.6	1.17
2	4.7	1.11
3	18.8	17.6
4	..	13.9, 13.9 (a)

(a) Sodium molybdate added to known molybdenum-free alloy, Fe, 13.9%.

Experimental Results

Effect of molybdenum on the iron determination was determined by running pairs of samples with and without removing molybdenum. Another sample known to contain iron, nickel, chromium, cobalt and titanium, but not molybdenum, was dissolved as usual, sodium molybdate added, and the complete procedure run. These results are given in the accompanying table.

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Higher Strength-Weight Ratio By Rigidizing

Architectural applications for Rigidized metal not yet fully developed are to be investigated and worked out by Davison-Fisher Associates, New York and Chicago building research development firm. According to R. S. Smith, president of Rigid-Tex Corp., this field offers a great many applications for the product. They are immediately proceeding with a development program, concentrating on the use of Rigidized metal to spandrels and curtain wall construction methods for multistory buildings. New large building projects are the first consideration under this plan.

The special strengthening and extra rigidity characteristics, plus the textured surfaces produced by the Rigidizing process, and its ready adaptability to aluminum and stainless steel sheet or strip, render the metal suitable for architectural uses, particularly in the interest of higher strength-weight ratios, unusual textural effects, plus ease of fabrication and pronounced durability.

Handling Methods Shown in New Film

Demonstrating the virtual "horse-and-buggy-to-automobile" transition from hand trucks pushed or pulled by human strength to motorized hand trucks effortlessly moving heavy loads by electric power, a new film entitled "Transporter Newsreel", has been announced by Automatic Transportation Co., Chicago. The new film is a two-reel, 18-minute, black and white, sound pictorial study of modern materials handling methods and operations.

Providing a dual aid as both a means of showing management ways to improve their materials handling methods and of giving visual instructions on the best applications of motorized hand trucks, the movie was filmed with the co-operation of the Lehigh Warehouse & Transportation Co. and its subsidiary, Lackawanna Warehouse Co., at whose Jersey City and Elizabeth, N. J., warehouses the action was photographed. It is available without obligation to management and other groups in industrial plants, business and trade associations, educational institutions, engineering societies, and other groups interested in effecting greater economies through mechanized handling. Screenings may be arranged through Automatic's home office, 149 West 87th Street, Chicago 20, or through any of the sales representatives.

Antifriction Bearings—*Concluded from Page 53*

complicated when the bearing is to be operated in a vertical position. In this case the matter of oil leakage is an added problem; variations of the spray or mist method are usually adopted. In one, a quill on the housing holds oil at a determined level below the bearing while a tapered slinger, clamped to the shaft, sprays the lubricant into the bearing. Through a return hole, drilled in the housing, oil which passes through the bearing is drained back into the lower chamber; this system prevents oil accumulation in a bearing, but gives constant oil mist deposit throughout the bearing, including retainer pockets.

Circulating oil feed systems are employed widely for vertical shaft applications and while more complicated in design they are usually justified by results, Fig. 36. In this application a screw pump forces oil upward through a hole in the center of the spindle to a level over the top bearing; lubricant then returns to the sump and through bearings by gravity. The screw pump threads and clearances are adjusted for return of oil at same rate it is pumped to the highest point. Reasonably effective bearing closures are required for such a system.

In another circulating system on vertical shafts a special shaped oil reservoir is clamped on the shaft below the bearings and when rotated the oil is forced upward where it strikes a scoop extending through the wall of the bearing housing. From this scoop the lubricant is thrown against the bore of the housing above the bearing. This prevents a volume of oil under pressure being concentrated at any one point; this might increase operating temperature.

Utilization of the lubricant for dissipating heat is sometimes required in circulating systems when ambient temperatures are high. In such an application the bearing housing is often subjected to heat above and moisture below; this requires good closure and provision for prompt circulation of adequate lubricant immediately upon starting. Oil is trapped above the bearings as it comes to a halt by a cup-shaped slinger; and at starting, oil is thrown into and through the bearings. There is no period of nonlubricated bearing operation each time the machine is started.

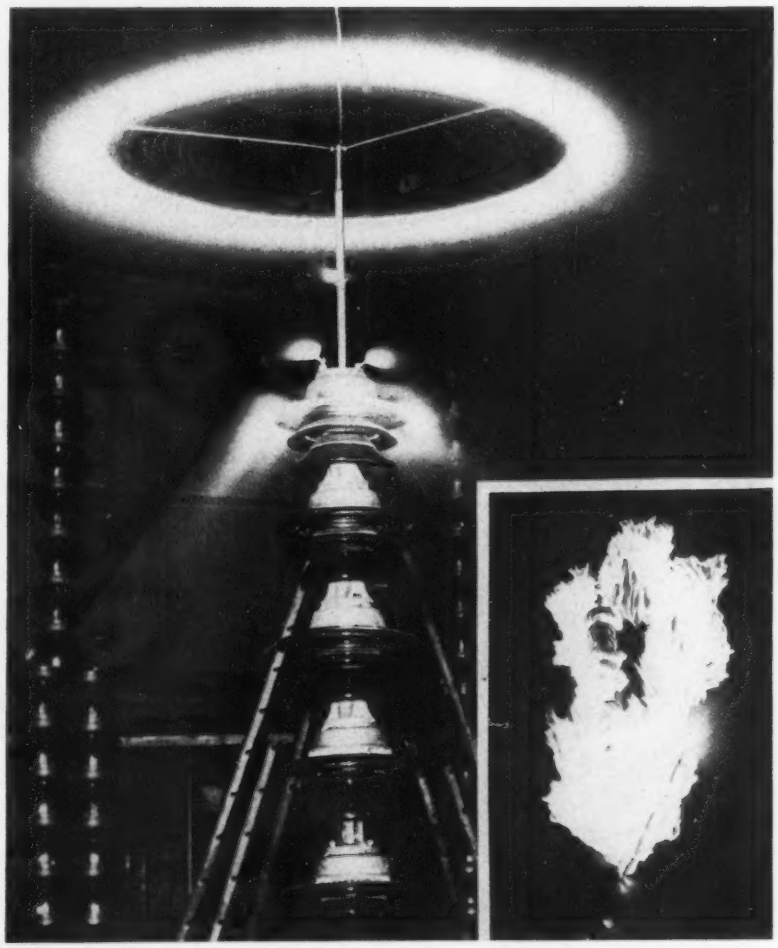
When fed in a spray, where speeds are extremely high, difficulty is encountered in regulating the volume of oil in minute quantities required. Oil fed in drops to rotating parts at high speeds may be off in globules instead of mist; contact may be impaired by windage of whirling parts.

Variations of the filter-wick feed are usually successful. Here filtered oil transferred from a reservoir by a wick to a highly finished tapered rotating member is discharged into the bearing in the form of mist; lubricant is lifted by capillary action from the reservoir below the bearing. Slingers on the side of the bearing opposite that from which the oil originates tend to draw the mist through, giving, in effect, a circulating system. Oil after passing through the bearing is returned to the reservoir. To utilize gravity flow in the filter, where speeds are extremely high, the reservoir is generally located above the bearings.

(To be concluded)

—o—

Gutters may be secured to buildings without permanently fastening them to their means of support. A removable latch element, invented by Louis J. Brune Sr., New Orleans, La., holds the gutter upright, at the same time permitting removal and replacement.



HIGH-VOLTAGE FIREWORKS: Fiery "pinwheel" above actually is a corona motor used to demonstrate loss of electricity through the air from high-voltage transmission lines. A 3-pronged rod is set on a bearing atop a string of insulators. One-million volts of electricity, fed from a transformer, spurt from the bent-back ends of the prongs. A reaction similar to the principle of jet propulsion causes the wire assembly to spin and create the pinwheel effect. Flaming torch at lower right, is the result when a million volts of electricity crackle over a string of insulators suspended from the ceiling. Such apparatus is used by Westinghouse engineers to aid them in designing equipment to protect factory buildings and other structures from hazards of lightning

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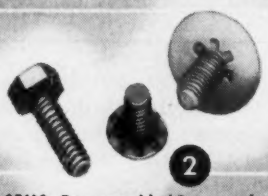

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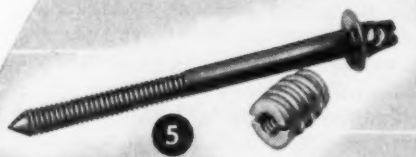

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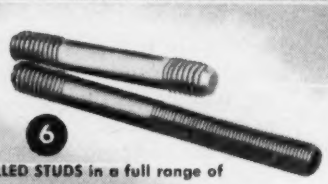

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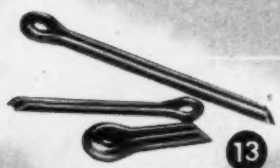

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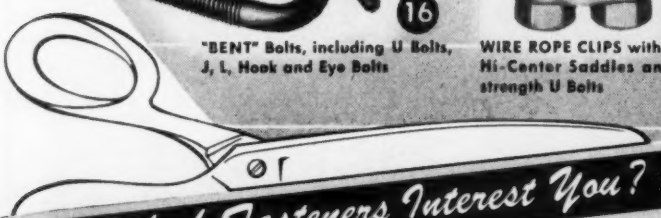

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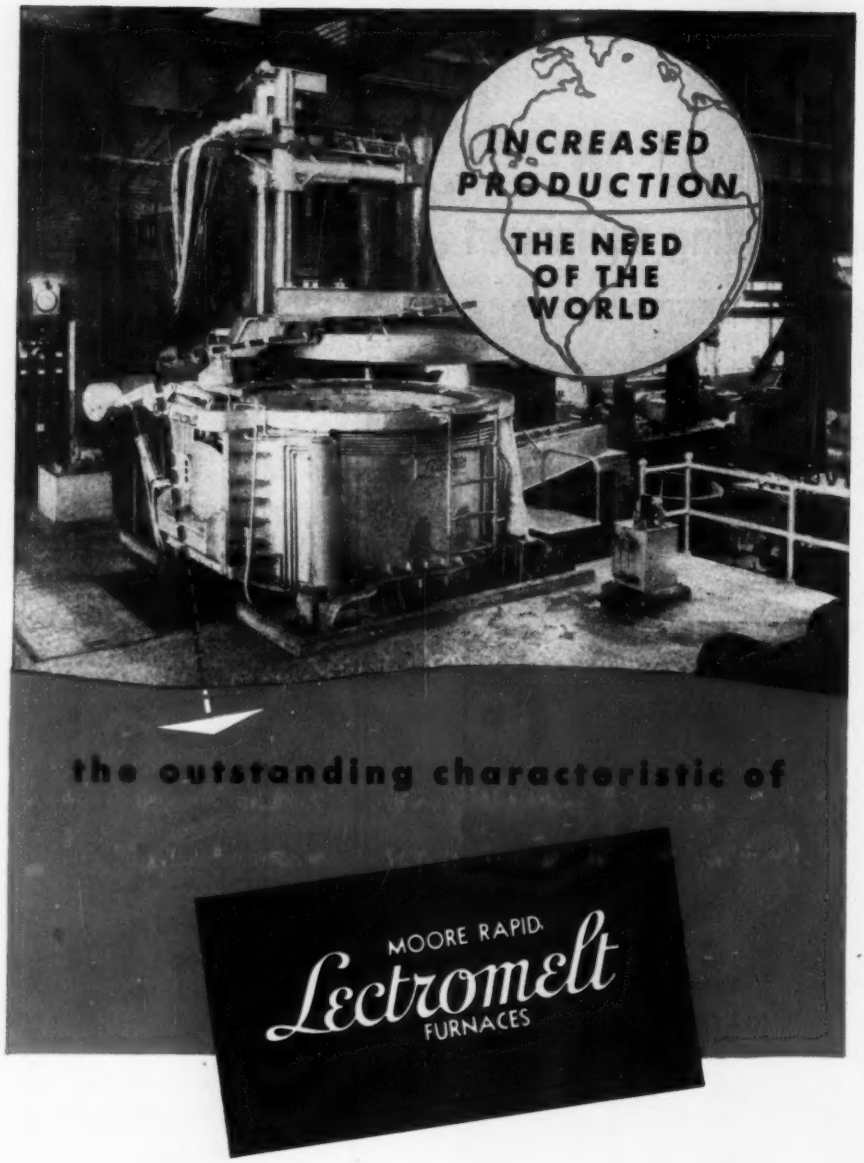

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Small Plane Automatic Pilot Weighs 35 Pounds

An outgrowth of the war-developed tank gun stabilizer, a new automatic pilot for planes which weighs but 35 pounds, is under development at the Westinghouse Research Laboratories, Pittsburgh. It is expected to be applicable to light commercial and private planes as well as military aircraft and possibly guided missiles, the company states.

Called the Gyropilot, it keeps the plane under control even in loops or barrel rolls. Its three gyros are said to respond to changes in angular velocity in a fraction of a second. Since they are fixed to the plane rather than maintaining a set position as the plane moves, the gyros cannot tumble or lose control no matter what the maneuver. The instrument reportedly automatically provides the proper bank on curves.

Standard Offered for Hot-Dip Galvanized Ware

Commodity Standards Division of the National Bureau of Standards announces that a proposed commercial standard for standard grade hot-dipped galvanized ware (coated after fabrication) has been submitted to producers, distributors, users and other interested groups, for approval or comment.

Proposed by the Galvanized Wire Manufacturers Council, the recommendation provides the major essential requirements for articles of galvanized ware which have been coated with zinc by the hot-dip process, after fabrication from sheet steel. Specifications for the recommended standard grade include requirements for quality of base metal and coating, workmanship, minimum weights per dozen of finished ware in various sizes and capacities, also important features of construction, and wording for labels or marking to indicate compliance with the recommended standards. Copies may be obtained from the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C.

—o—

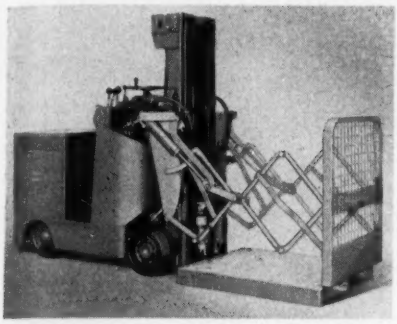
Key men in the organizations representing Societe Genevoise D'Instruments de Physique, Geneva, Switzerland, met in that city the week of December 10 for a refresher course. They were shown several of the new developments which have been made recently by SIP, manufacturers of high precision machine tools and measuring instruments. The Swiss organization is represented in this country by Cosa Corp., New York.

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 96

1. Pallet Retriever

An accessory mechanism, compact and attachable to the forward or fork end of the lift truck, is being offered by Elwell-Parker Electric Co., Cleveland 14, O., for the retrieving of pallets. The load handling or stabilizing device consists of two hydraulically actuated pantograph type rams which terminate in a screen frame which

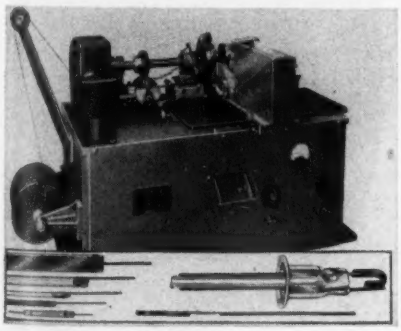


retains in a fixed position the load to be deposited.

Load is picked up on a pallet or on forks of truck, moved into shipping position, then removed from pallet or forks by the ram-actuated accessory. Rams are self adjusting to fit and follow the contour and vertical or lateral motion of the unit load as the truck with the pallet backs away and withdraws the pallet from beneath the load. They may be operated in the corner of a boxcar.

2. Automatic Welder

Welding and shaping of light, small parts are performed automatically by an electronic welding and timing device of the new machine developed by Tweezer-Weld Corp., 1060 Broad St., Newark, N. J. Assemblies or

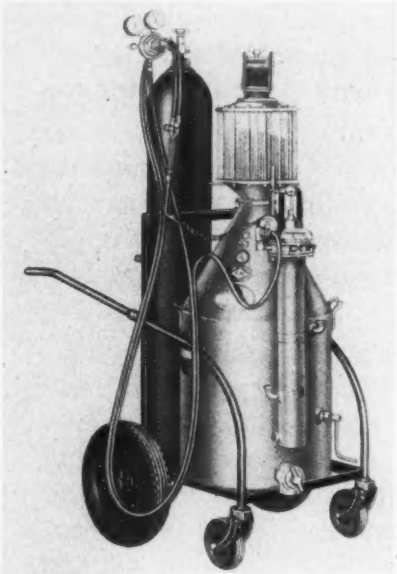


small parts are fed to a turret either by hand or automatically from a hopper.

Before or after the welding process, components can be shaped so that the welded parts, when they leave the machine, are ready for assembly into the final product. A typical application is attaching light wire from a spool to parts fed automatically.

3. Acetylene Generator

Lighter weight, greater portability and maximum safety are features of the improved 14ND carbide acetylene generators, made by Sight Feed Generator Co., Richmond, Ind. Installed



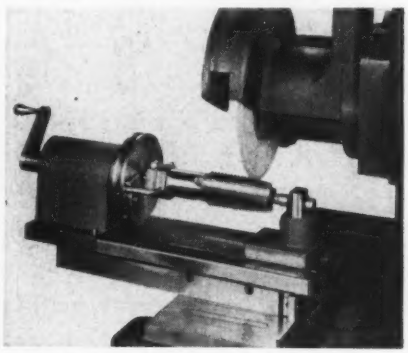
on pneumatic rubber tired trucks, the generator has a safety which will stop all flashbacks which come from improper torch operation.

Model PS generators are offered in four sizes with capacities of 30, 60, 125 and 250 cubic feet per charge.

4. Thread Grinder

Ability to grind threads of any shape on any standard make of surface grinder is claimed for the new thread grinder 6 inches high, 4 9/16-inches wide and weighing 26 pounds, developed by Tinker's Thread Grinder Co., 169 Granby Rd., South Hadley Falls, Mass. It may be held on a magnetic chuck. A 4-inch sine bar on the end of the base is used for setting the helix angle of a thread.

A hand crank is attached to a master lead screw which in turn is directly connected to the live, ball bearing center face plate. Work is rotated by the face plate driving a dog attached to the work. As the



lead screw is revolved by turning the hand crank, the form dressed on the wheel is ground in the work and at the desired pitch.

5. Notcher

Sheet materials may be rapidly and accurately notched with the new Di-Acro notcher developed by O'Neil-Irwin Mfg. Co., Lake City, Minn. A 90 degree notch of any size within the machine's capacity may be cut in one operation either at the corner or in any position along the edge of a sheet which may be up to 16 gage steel. It

is also possible to shear angles both smaller and greater than 90 degrees, as well as performing straight shearing operations.

Maximum 90 degree notch is 6 x 6 inches. Action of notches is obtained through a roller bearing cam which evenly distributes shearing

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Again, 'Surface' has proved ability to meet industry's needs by providing equipment to accomplish a desired result. This flexibility in equipment application has simplified operation and lowered production costs for operators.

In addition to one-way fired soaking pits, 'Surface' has a complete line of heating and heat treating equipment including slab heating furnaces—billet reheating furnaces—continuous heat treating furnaces for plate—continuous strip annealers and normalizers—pit-type convection furnaces for annealing rod, wire or strip in coils, high alloy rod and bar, atmosphere annealing furnaces of car-bottom lift-cover type—bright annealing and normalizing furnaces for tubing—stress relief furnaces—wire patenting furnaces—annealing covers, and the foremost equipment in prepared atmosphere generators for practically every heat treating operation.

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Above: A most re 'Surface' Oil-Gas O Way Fired Soaking installation at Cia Fu dore de Fierro, Monte Mexico.

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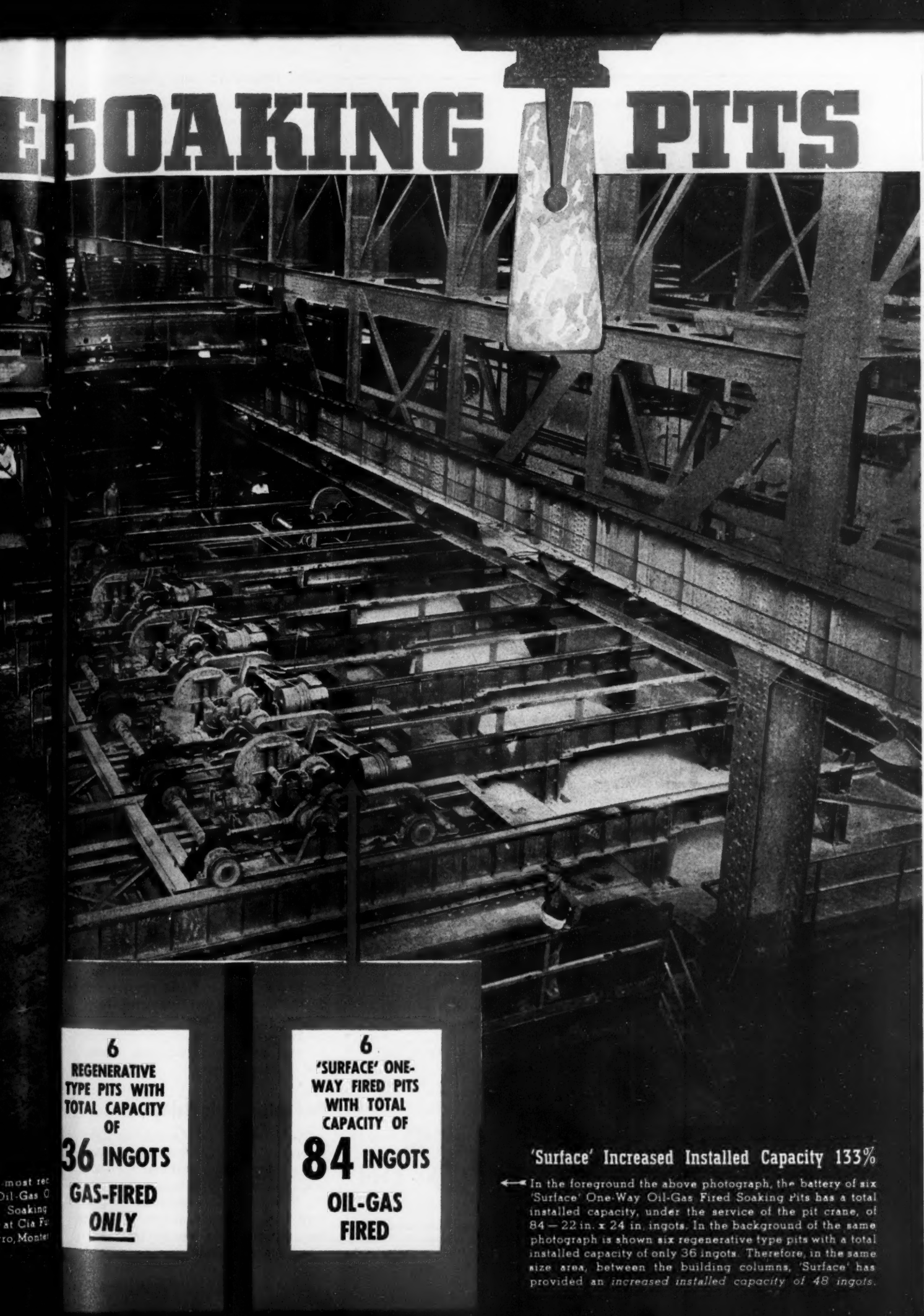

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OIL-GAS FIRED

'Surface' Increased Installed Capacity 133%

← In the foreground the above photograph, the battery of six 'Surface' One-Way Oil-Gas Fired Soaking Pits has a total installed capacity, under the service of the pit crane, of 84 — 22 in. x 24 in. ingots. In the background of the same photograph is shown six regenerative type pits with a total installed capacity of only 36 ingots. Therefore, in the same size area, between the building columns, 'Surface' has provided an *increased installed capacity of 48 ingots.*

18-8

AND THE ODDS ARE

...3 TO 1....

THE odds are 3 to 1 that castings made from one of the famous Circle Ⓛ "18 and 8" alloys will do a better and more practical job in resisting corrosive conditions than those made from any other formula.

We pour a lot of alloy tonnage out of our electric induction furnaces in the course of a month. Some of it is very special stuff. All of it is carefully matched to the exact service conditions of the equipment and machinery into which the castings are fabricated. A study of our records proves beyond a doubt that our Circle Ⓛ "family" of "18 and 8" alloys tops the list as the practical, economical corrosion resistant material.

The Nominal Analysis and Nominal Physical Properties of one of these, Circle Ⓛ 22, are given at left. However there are many variants of this approximate analysis which make possible its successful application to a wide range of service conditions. They are summarized on the new Circle Ⓛ Alloy Data Sheet, sent upon request.

LEBANON CIRCLE Ⓛ 22

NOMINAL ANALYSIS

Carbon Max.	0.07
Silicon	1.25
Manganese	0.75
Chromium	19.50
Nickel	9.00

NOMINAL PHYSICAL PROPERTIES

Tensile Strength	75,000
Yield Point	36,000
Elongation in 2"—%	50
Brinell Hardness	135

LEBANON STEEL FOUNDRY, LEBANON, PA.
"In The Lebanon Valley"
ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

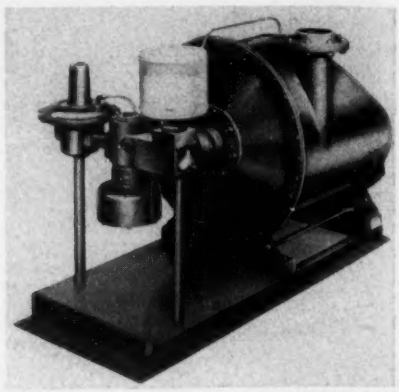
LEBANON *ALLOY AND STEEL* Castings

CIRCLE L

pressure on both shear blades. Cutting head is a solid block of alloy tool steel hardened and ground. Adjustable blades are of alloy tool steel.

6. Gas-Air Mixer

Premixing any commercial, natural, manufactured or liquid petroleum gas with air in any desired proportion and in any desired quantity within the capacity of the unit is the function of the gas-air mixer developed by Gas Appliance Service Inc., 1211 Webster Ave., Chicago 14, Ill. Mixture is then delivered to the burners under constant pressure.



Close temperature control, high heat input, practically unlimited turndown range, high burner pressure and any desired flame characteristic are features. It may be adapted to such operations as automatic brazing and soldering, flame hardening, atmosphere units and furnaces utilizing a high rate of heat input.

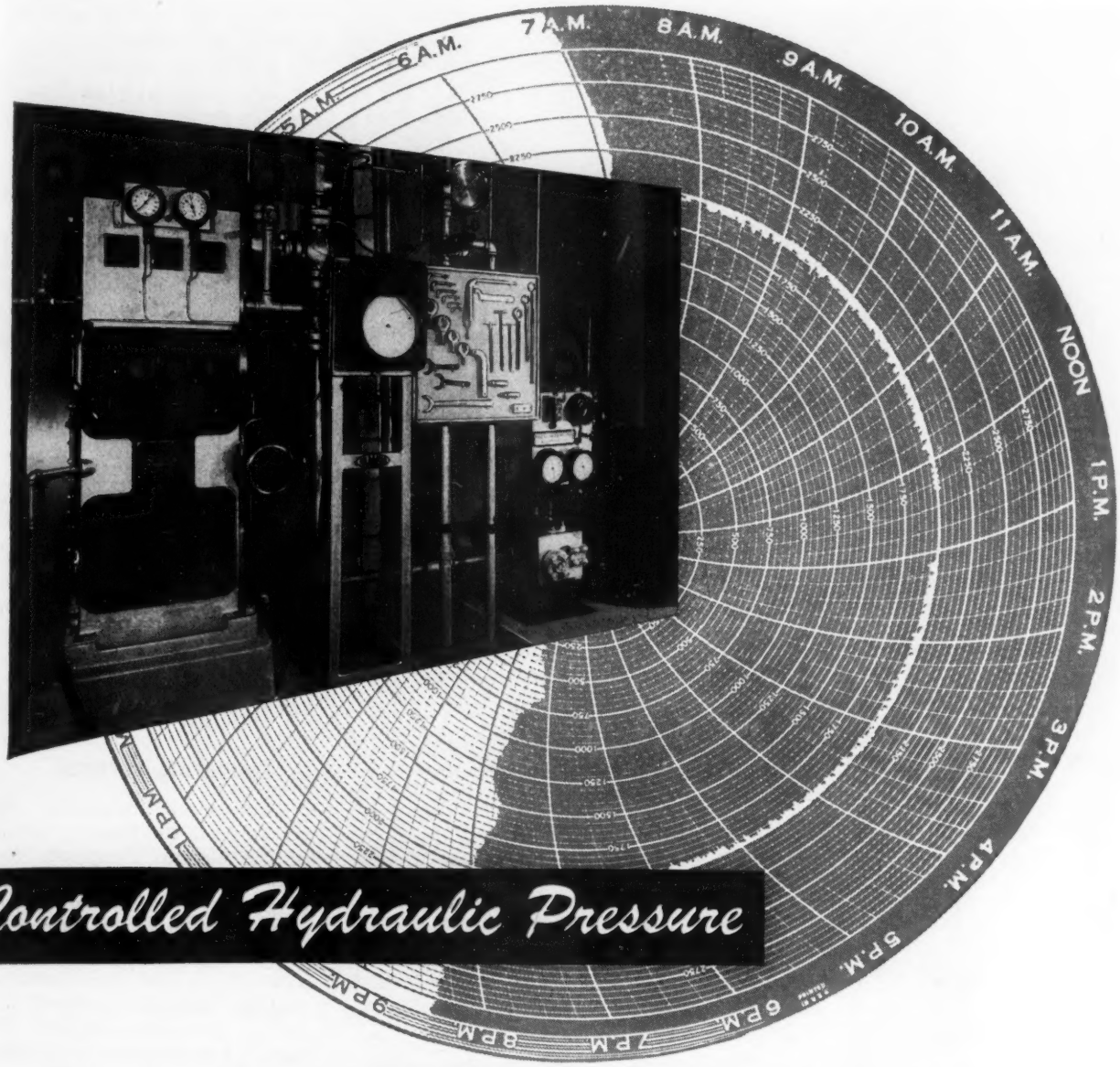
Several models offered provide mixture capacities from 3000 to 18,000 cubic feet per hour with discharge pressures from 28 to 32 ounces.

7. Tangent Benders

Single wing type tangent bending machines, designed by Struthers Wells Corp., Titusville, Pa., fill the demand for less expensive machines for making cabinets and many other items. Machines will tangent bend (radially edged bend) sheet metal up to ⅛-inch or more in thickness as well as light structurals, tubing and extruded shapes.

8. Photoelectric Relay

Operating on the modulated light principle, a new photoelectric relay and light source, produced by General Electric Co., Schenectady 5, N. Y., has sufficient sensitivity to prevent false operation due to the weather at distances up to 1000 feet. Applications include traffic control,



Controlled Hydraulic Pressure

with the ALDRICH-GROFF "POWR-SAVR" Pump

When it comes to maintaining constant hydraulic pressure—you can pat yourself on the back if you've installed an ALDRICH-GROFF "POWR-SAVR" Pump.

Because—the "POWR-SAVR" maintains so constant a pressure that variance does not exceed 2% to 5% of that desired.

Take a look at the pressure chart above. It's an actual record of the hydraulic system at Parker Stearns & Company, manufacturers of rubber and plastics, in Brooklyn, N. Y.—and it shows the practically constant pressure that is maintained by the ALDRICH-GROFF Pump.

Furthermore, this constant pressure isn't the only feature. The installation, which consists of the "POWR-SAVR" and an Aldrich Centrifugal Pump for prefilling hydraulic presses under low pressure, comprises a *centralized hydraulic system* that serves a large number of presses. This simple system assures compactness, a minimum of investment expense, quick accessibility, easy maintenance and greater operating economy. It also affords ease in adjustment of hydraulic pressure to suit varying requirements.

Write, today, for more information—or guidance on your hydraulic problems.

ALDRICH

THE ALDRICH PUMP COMPANY

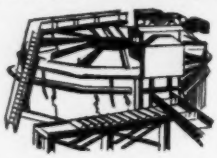
2 GORDON STREET, ALLENTOWN, PA.

Representatives: Birmingham • Bolivar, N. Y. • Boston • Chicago • Cincinnati • Cleveland • Denver • Detroit Duluth • Houston • Jacksonville • Los Angeles • New York • Omaha • Philadelphia • Pittsburgh • Portland, Ore. • Richmond, Va. • St. Louis • San Francisco • Seattle • Spokane, Wash. • Syracuse • Tulsa

GASMACO INDUSTRIAL FURNACES

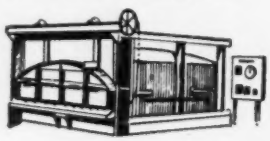
OIL or GAS FIRED for ALL TYPES of HEAT TREATING

DOUGHNUT ROTARY HEARTH FURNACES



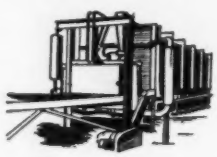
This particular furnace has baffle walls to shield controlled heating zones from high temperatures of the combustion zone, providing more accurate, uniform heating. Special insulation provides faster heating with minimum wall losses for fuel economy. Automatic charging and discharging machinery reduces labor requirements.

BOX TYPE FURNACES



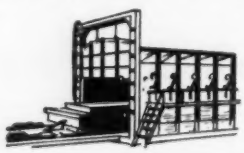
Built to specification for sintering, brazing, bright forging, annealing, hardening and draw. Designed to meet the increasing need for prepared atmospheres which will discharge material free from scale or surface decarburization. Furnished in continuous, semi-continuous or batch type for fuel fired furnaces.

RADIANT TUBE FIRED ROLLER HEARTH FURNACES



An exclusive feature of these furnaces is the Carbofrax* Tubes and Rollers which permit firing in excess of 2500° F, with fewer replacements. Complete control of the furnace atmosphere is provided. Annealing is accomplished without decarburization or scale in simple, inexpensive car, pusher, conveyor, chain or roller hearth type furnaces.

CONTROLLED ATMOSPHERE CAR TYPE FURNACES



Simply designed for long, trouble-free service and little or no maintenance. Equipped to handle material of nearly any size, shape and height. Ideally suited for heat treating, spheroidizing and annealing applications.

*"CARBOFRAX" is a registered trade-mark indicating manufacture by the Carborundum Co.

All GASMACO furnaces are individually designed to fit your particular furnace requirements to assure maximum operating economy. It will pay you to investigate these furnaces for your next heat-treating job.

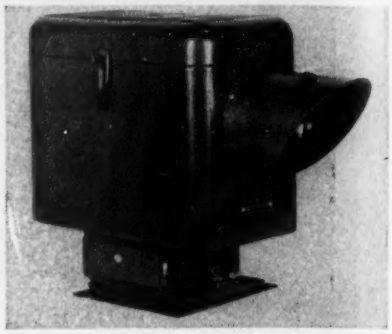
THE GAS MACHINERY COMPANY

16116 WATERLOO ROAD
CLEVELAND 10, OHIO

Designers• Fabricators• Erectors
Gas Plant Equipment and
Industrial Furnaces

counting and limiting and restricted location protection.

Light source (illustrated) contains a lamp, transformer and motor driven slotted disk which interrupts or modulates the light beam at about 900 cycles per second. The photoelectric relay has a tuned circuit, allowing it to be responsive only to a light beam modulated at this frequency. It is not sensitive to changes in natural or artificial illumination. Light source has an infrared filter which removes most of visible light from the beam.



9. Tempering Furnace

Tempering or drawing of tool and die steels is the primary application of the electric Temp-Rite furnace, developed by Hevi Duty Electric Co., Milwaukee 1, Wis., but it may be used for practically any heating operation requiring temperatures up to 1250° F. A box type chamber with heating elements mounted on the vertical side walls comprises the furnace. A high speed centrifugal fan is located at the rear of the chamber with shaft extending through the rear wall.

A heat resistant alloy baffle directs the flow of air from the fan through a narrow passage between the heating elements and alloy baffle, then into work chamber and back to fan intake. Ledges for locating shelves at various levels are provided.

10. Variable Speed Motor

Maintaining constant maximum torque at all speeds, the new variable speed motor, made by Guernet Electrical Machinery Inc., Box 196, Meriden, Conn., has step-less speed control from 1500 to 6000 revolutions per minute. It is a 1/5-horsepower, ball bearing, universal wound motor which is reversible and operates on 115 volts, single phase, any frequency.

Lever at the side of the motor stops and starts it and mechanically controls a pair of centrifugal vibrat-

built to keep going

where the going's toughest!

THE NEW DELCO MOTOR

Sand, scale, dirt and dust in the air? Forget it! Completely protected by its totally enclosed, double-shell frame, this great new Delco Motor takes all these in its stride.

Everything about the new Delco Motor promises a superior kind of steady, cool-running performance. New materials and new design practices make it more rugged, better ventilated and insulated. New simplicity and accessibility make maintenance a much less frequent and less costly process.

Put this really *new* motor to work in foundry, factory, mill or forge plant—*anywhere* conditions are tough—and watch it prove its outstanding value! Write for complete data.

CHECK THESE FEATURES OF THE NEW DELCO MOTOR

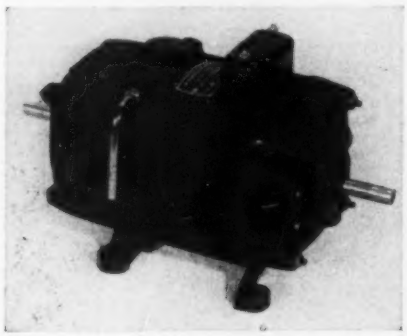
- Totally enclosed; fan-cooled.
- Individually taped coils.
- Thoroughly insulated windings.
- Unit-cast, ball-bearing rotor, dynamically balanced; parts interchangeable end to end.
- Double-shell frame with new simplified cooling system.
- Extra-large, watertight conduit box; usable in four 90-degree positions.
- Extended, accessible mounting feet, cast as a unit with main frame.
- From 1½ h.p. through 50 h.p.; NEMA frame sizes, 224 through 505.

DELCO MOTORS

DIVISION OF GENERAL MOTORS CORPORATION

DELCO PRODUCTS · DAYTON, OHIO

ing contacts which accomplish the speed variation. The lever lends itself to mechanical coupling. The motor is



available with single and double reduction gears and flexible shafts.

11. Vacuum Gage

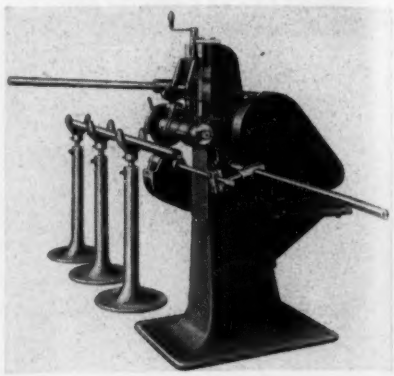
Designed for use where there is need for continuous measurement of reduced pressure, the type EMG vacuum gage, a portable instrument made by Engineering Products Department of Radio Corp. of America, Camden, N. J., is composed of two types of gages, a thermocouple gage and a discharge gage. These gages, connected to a vacuum system, actuate the meters in the control unit. Gages incorporate IPS standard fittings.

Long cables and connectors extend from the gages to the cabinet, providing flexibility. All controls are on the front panel. Power supply for both gages is contained in the cabinet. Range is from atmospheric pressure to less than 0.1 micron Hg. Response to pressure changes is practically instantaneous.

12. Pipe and Tube Cutter

Continental Machine Co., 1952 Maud Ave., Chicago 14, Ill., is manufacturing the Steen high speed pipe and tube cutter in three sizes for cutting pipe or tubes from ½ to 3 inches, ½ to 6 inches and 3 to 12 inches respectively. An attachment permits the first two to cut pipe from ⅛ to ½-inch in diameter. Shaft of cutter made of chrome-nickel steel, heat treated for toughness and provided with a roller bearing to reduce operating power.

Gears of unit are also of heat treated chrome-nickel steel. Cutter block rolls are made of hardened tool steel and are provided with roller bearings and tool steel pins which allow pipe to turn freely. On the two models of smallest capacity an improved gage works automatically with the cutter

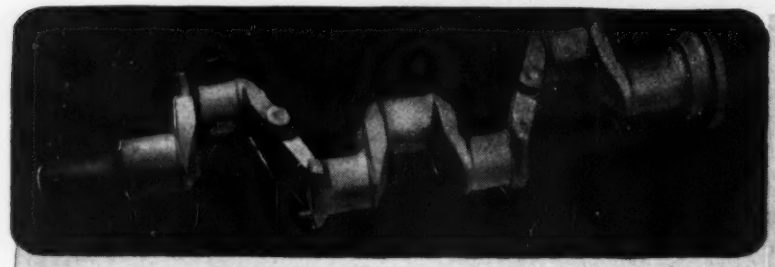


arm, enabling maximum output to be obtained with wear and friction reduced.

13. Lift Truck Attachment

An upender and roll grip attachment for fork lift trucks which provides safe handling of heavy cylindrical loads is a development of Towmotor Corp., 1226 East 152nd St., Cleveland 10, O. Cylindrical loads may be handled in either a horizontal or vertical position, the attachment

(For more information, use the card following page 96.)



In

AGRICULTURE

Atlas Drop Forgings have their important place in every farming implement, from plowing through harvesting. Their great strength with light weight frees engine power for field work, assuring maximum operating satisfaction.

Atlas Drop Forgings also Excel in

Air Conditioning	Earth Moving
Automotive	Food Machinery
Aviation	Marine
Bridge	Oil and Gas
Compressor	Railway
Diesel	Refrigeration

and Many Other Divisions of Industry

ATLAS DROP FORGINGS

ATLAS DROP FORGE COMPANY • LANSING 2 MICHIGAN

Add Lasting Sales Appeal to Painted Surfaces

with REPUBLIC ELECTRO PAINTLOK

In spite of the abuses of heavy traffic, these automatic merchandisers will retain their eye-catching appearance through many years of service—because they are built of Republic ELECTRO PAINTLOK.

These chemically-treated, zinc-coated steel sheets always assure lasting painted surfaces. They *take* and *hold* paint, lacquer and enamel indefinitely.

They come to you clean and in prime condition for painting. They require no pre-paint cleaning or degreasing. They do not rust in storage. They eliminate the need for extra pickling before storing.

Their zinc coating is *tight.* It stands severe fabrication without cracking, peeling, flaking or powdering. It prevents underfilm corrosion, should the paint coating be damaged.

You can use Republic ELECTRO ZINC PLATED SHEETS profitably, for any product involving the application of paint on sheet steel . . . from vending machines to trailer bodies. For more information, write to:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic Electro Plated Zinc Products include ELECTRO PAINTLOK and ELECTRO ZINCBOND in sheets and coiled strip, in various widths depending on the gauge involved.

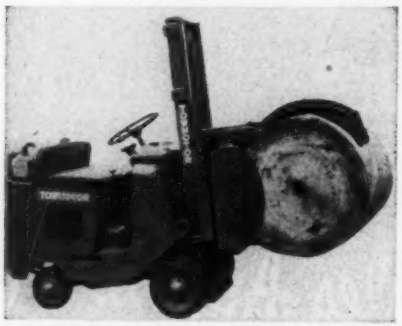
REPUBLIC STEEL

Republic
ELECTRO ZINC PLATED SHEETS
Electro Paintlok • Electro Zincbond

Other Republic Products include Carbon, Alloy and Stainless Steels—Sheets, Strip, Plates, Bars, Pipe, Tubing, Bolts and Nuts, Wire

featuring vise-like curved arms which hold the load.

One arm is stationary and the other, hydraulically operated, closes against the load, holding it in any position for traveling or stacking. It is intended for mounting on a



standard Towmotor model Lt-40 fork lift truck having a maximum lifting height of 108 inches and a capacity of 1700 pounds at 20 inch load center.

14. Gravity Conveyor

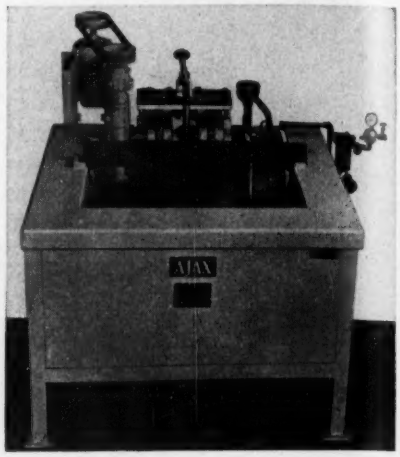
A two-in-one portable roller gravity conveyor, one side of which has the side rails projecting above the rollers and the other with rollers above the side rails for wide packages, is being made by Island Equipment Corp., 101 Park Ave., New York 17, N. Y. One person can turn these extremely light conveyors over for the particular type of work to be handled.

Legs are supplied in double post type, with adjustable height units varying from 12 to 72 inches. Sections are 10 feet long and widths inside frame are 14¾ or 16¾ inches. Ninety degree curves are offered. Rollers are 16-gage, 2 inches in diameter, with rolled ends set on 4-inch centers.

15. Quench Furnace

Interrupted quenching such as is used in martempering, austempering and cyclic annealing (isothermal heat process)is the intended use of the new Ajax Hultgren electric salt bath furnace developed by Ajax Electric Co., Frankford Ave. at Delaware Ave., Philadelphia 23, Pa. By using TTT or "S" curve data, this process imparts new physical properties to metal parts. The furnace employs the principles of a heat exchanger to hold the quenching bath at a constant temperature.

To provide the maximum cooling power, it is essential that the bath be agitated vigorously to extract the heat from the work being quenched as rapidly as possible. This furnace



is provided with a motor-operated, high capacity submerged pump (shown at left). In martempering and austempering, work is usually austenitized by heating in a neutral salt bath prior to quenching in the isothermal quench bath. A salt separator prevents contamination by salt from the austentizing bath.

Furnace can be heated by immersed

(For more information, use the card following page 96.)

A Complete Warehouse Service for...
SHEETS • PLATES
STRIP • STAINLESS STEEL
TIN PLATE • BARS • SHAPES
WIRE PRODUCTS • ALLOYS
Adequate Stocks!
Prompt Shipment!
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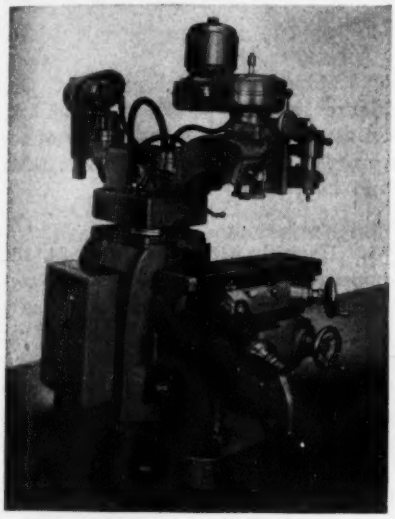
WORLD-WIDE EXPORTERS • 620 FIFTH AVENUE, NEW YORK CITY
Tri-Boro Steel Supply Co. Inc.

electrodes for high temperature work, or by immersion heating elements for low temperature work.

16. Tool, Die Milling Unit

Production of plastic and permanent molds, metal patterns, die casting dies and small drop forging dies is possible with the new 8 x 18-inch tool and die milling machine, announced by Cincinnati Milling Machine Co., Cincinnati 9, O. Machine has sensitive hydraulic tracer mechanism which provides automatic duplication of intricate shapes with a high degree of accuracy.

Tracer finger contact pressure is very light to permit use of wood,



plaster of paris, or other soft, easily worked materials for the master shape. A wide range of angular milling jobs may be performed, made possible by a double swivel arrangement of the spindle head in which the head swings on segments of circles, the centers of which lie close to the cutter tip. High and low series of spindle speeds and rotation are selected by a single lever. Spindle speeds from 225 to 4000 revolutions per minute are offered.

17. General Purpose Welders

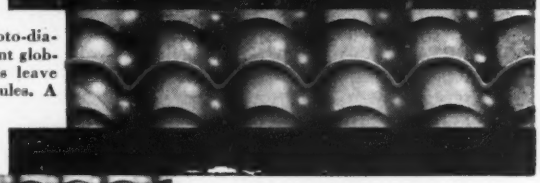
Designed to conform with REA and NEMA specification requirements, several improved general purpose, limited input transformer type welders have been designed by Trindl Products Ltd., 17 East 23rd St., Chicago 16, Ill., for use on single phase, rural and other power lines of limited capacity. They are available both with and without power factor correction in output ratings of 130 and 180 amperes.

Units are supplied ready to operate with headshield, electrode holder,

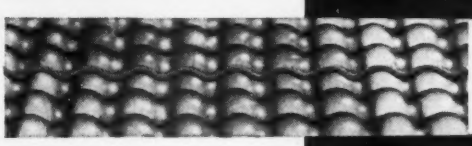
NEW Brake Shoe MICRO-SPRAY
TRADE-MARK

14 EXCLUSIVE ENGINEERED EXTRAS Give You
FINER ATOMIZATION
MORE EVEN DISTRIBUTION

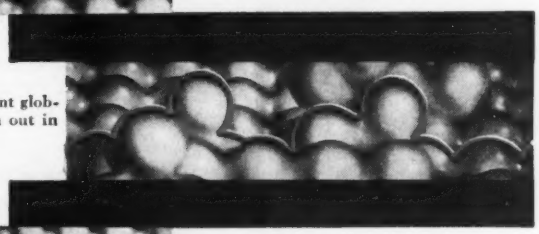
ORDINARY SPRAY GUN ATOMIZATION—Photo-diagram of greatly magnified sprayed paint globules show how large paint globules leave deeper, visible valleys between globules. A wavy, low-gloss finish results.



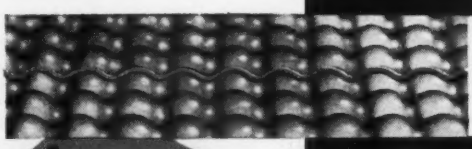
Brake Shoe MICRO-SPRAY ATOMIZATION — Finer, microscopic paint globules leave much shallower, invisible valleys between globules, resulting in a smoother, higher-gloss finish.



ORDINARY SPRAY GUN DISTRIBUTION—Paint globules pile up in some areas and thin out in others due to irregular air stream.



Brake Shoe MICRO-SPRAY DISTRIBUTION—Uniform flow of paint globules to the surface provided by uniform precision and streamline design of air passages, which prevent eddy currents.



SAVES TIME, SAVES AIR, SAVES PAINT, SAVES MONEY, TOO

American Brake Shoe Company, Kellogg Division S-1
Rochester 9, New York
Please send me complete information on the NEW Brake Shoe MICRO-SPRAY Gun.
NAME_____
FIRM_____
STREET_____
CITY_____ ZONE___ STATE_____

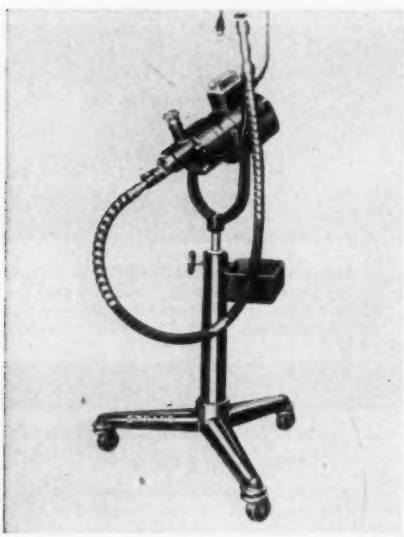
A PRODUCT OF
AMERICAN Brake Shoe COMPANY
© 1948
KELLOGG DIVISION

welding, power and ground cables, wall receptacle, assorted welding rods and operating instructions. They have 36 secondary output current heat

stages ranging from 20 amps to their rated maximum secondary outputs. Class B spun glass insulation is used throughout.

18. Flexible Shaft Machine

Two sets of helical cut hardened steel gears, running in lubrication are featured in the 4-speed gear drive flexible shaft machine, the Rotoflex, developed by N. A. Strand & Co., 5001 North Wolcott Ave., Chicago 40,



Ill. By means of an eccentric driving shaft sleeve assembly, one or more master gears may be engaged by a slight rotary motion as well as axial movement of sleeve for several different speeds.

Grinding, buffing, sanding, drilling, rotary filing, screw driving, nut setting and other operations may be performed. Standard machines have speeds of 850, 1800, 3600 and 4500 revolutions per minute, while high speed machines have speeds of 1700, 3600, 7200 and 9000 revolutions per minute.

DEVELOPED BY . . .

19. Hobart Bros. Co., Troy, O., No. 111HT electrode for downhand welding of high tensile low alloy steels. Spray type arc makes easy to handle and spatter loss is low. Tensile strength is 70,000 to 80,000 pounds.

20. Hanson - Van Winkle - Munning Co., Matawan, N. J., Surbrite S and Surbrite H acid inhibitors to be added to sulphuric and hydrochloric acid pickling solutions. They have a wetting property and give pickled steel a bright surface.

21. Stanley Electric Tools, New Britain, Conn., light weight portable drill No. 24 of 1/4-inch capacity for drilling in metal, wood or composition materials. It has three-jaw geared threaded Jacobs chuck.

22. National Dunnage Co., Dallas 6, Tex., a spur cleat in several sizes, designed to withstand strains caused by handling devices on corners of boxes, crates, etc. Spurs fasten it to box. It is also useful for bracing.

23. Trico Fuse Mfg. Co., Milwaukee 12, Wis., an unbreakable bottle oiler of visible capacity type for use where space between oil hole and machinery is limited. It will lubricate solid, wick or waste-packed bearings.

24. Mine Safety Appliances Co., Pittsburgh 8, Pa., an air line heater to heat air prior to breathing through a respirator. Weighing but 4 pounds, it supplies thermostat - controlled comfortably warm to 30° below zero.

25. Chicago Tool & Engineering Co., Chicago 17, Ill., a Palmgren indexing and milling attachment for difficult operations on engine lathes. Model 300 will take work up to 4 inches in diameter and 1-1/2 inches between centers.

26. New Method Steel Stamps Inc., Detroit 7, Mich., semiuniversal self-centering and self-aligning holder for marking various sizes of solid round bar stock with part numbers, etc.

27. Eutectic Welding Alloys Corp., New York 13, N. Y., an arc-vapor cutting tool, the CutTrode, a rod-form cutting tool which permits unskilled operators to make relatively thin cuts through steel. Two seconds are required to pierce 1 inch of steel, using the rod in any electrode holder.

28. Paul Valve Corp., New York 35, N. Y., a palm-size hose valve with two moving parts. Hydraulic pressure in hose does most of the work in opening and closing. Offered for 1/4 to 1 inch hoses at pressures up to 75 pounds.

29. Liquid Carbonic Corp., Chicago 23, Ill., Gasweld AV-10 lightweight welding torch within cutting attachment. Tips are furnished in sizes 1, 2 and 3. Latter will cut up to 1/2-inch steel.

30. Monroe Auto Equipment Co., Monroe, Mich., a collapsible pallet box, an all-wood pallet and full line of accessories for pallets, flatforms, skids and boxes.

31. Hannifin Corp., Chicago 24, Ill., improved automatic air pressure regulating valve. It is for use on primary air pressures up to 150 pounds per square inch and may be set to maintain secondary pressures from 125 down to 5 pounds.

32. Division Lead Co., Chicago 22, Ill., nonacid soldering flux for fast, complete fluxing of oily and uneven surfaces. Known as No. 229, it does not pit, corrode or discolor and residue is removed with water.

33. Lapeer Mfg. Co., 2906 West Grand Blvd., Detroit, Mich., a kit of holding devices for handicapped persons. With them, an amputee can lock almost any kind of a tool within its grip. Gripping pressure is adjustable.

34. Scott Aviation Corp., Lancaster, N. Y., self contained breathing equipment, the Senior Sling Air-Pak model 6000-B4, which is light and fits body contours. It provides a minimum of 15 minutes use at extreme exertion.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL SUPPLY—Consumers continue to worry along without any concrete sign of early improvement in steel supply. Demand holds in undiminished volume. And the outlook for procurement is obscured by uncertainties attending the government's voluntary allocation program. This is still aborning and until more is known as to how it will operate, who will be affected and to what extent volume for the run-of-mine buyer will be curtailed, if at all, there is bound to be a high degree of uncertainty in the markets.

Despite discouraging factors some steel producers plan to establish second quarter consumer quotas within the next two weeks. These, of course, will be subject to later adjustment to conform with requirements of the voluntary allocation plan and European aid. Prospects are quotas will be lighter because priority tonnage likely will be increased and because seasonal difficulties may enlarge arrearages.

INGOT CONVERSION—No letup in the complicated ingot conversion market is indicated. In fact, reports are heard the tempo of such activities may increase should steel exports involve large tonnages. Such a development would necessitate cutbacks in mill allotments to customers who in turn might turn to the conversion market as a way out of their supply difficulty. Rerolling ingots are reported selling in the open market at $90 to $95 per ton, while rerolling billets, blooms and slabs are commanding $85 and higher, with sheet bars quoted up to $105.

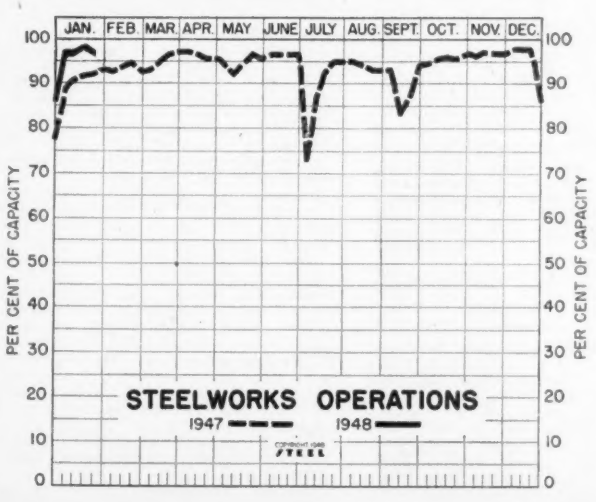
STEEL PRICES—Spot announcements of price adjustments continue to be made. Last week a leading producer effected a $4 per ton increase on long ternes, an eastern platemaker upped its prices $5 per ton, several nail makers adjusted their prices upward, and a producer of enameling sheets raised prices $1 per ton. Raw materials are strong pricewise, at the moment coke appearing to be definitely headed toward higher levels.

SCRAP—Tight supply conditions in scrap are not likely to be relieved for some time to come. At the moment open hearths are reported being closed down at several points for lack of scrap. The market is in an exceptionally strong position currently with weather conditions interfering with collection and preparation. Prices on the steelmaking grades are unchanged in the absence of active buying by the mills, but cast grades continue to skyrocket.

STEEL OPERATIONS—Ingot operations are reaching peacetime high levels, but the natural gas stringency, oil shortages, etc., are hampering finishing mill operations. More tonnage likely will be produced in second quarter since warmer weather should loosen the flow of scrap, gas shortages can be expected to disappear, coke supply should become easier and pig iron production usually improves as the winter wanes.

Production of ingots increased to a new peacetime high of about 1,732,200 net tons last week. Based on revised capacity figures, estimated national ingot rate was 96.5 per cent, a small rise from the previous week's figure. Operations dropped 6 points to 95.5 per cent in Pittsburgh and 2 points to 100 per cent and 93 per cent, respectively, in Birmingham and Chicago. Cincinnati operations rose 9 points to 100 per cent.

PRICE COMPOSITES—Finished steel composite, as compiled by STEEL, increased to $78.41 from $78.18 and compared with $69.82 for the like 1947 week. Semifinished steel price average rose to $65.10 from $57.20 and compared with $52.10 a year ago. Steelmaking pig iron composite held steady at $39.16 and compared with $29.56 a year ago. Average on steelmaking scrap held at $41.92 compared with $31.17 a year ago.



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended Jan. 24	Change	Same Week 1947	Same Week 1946
Pittsburgh	95.5	— 6.5	99	1.5
Chicago	93	— 2	90	4.5
Eastern Pa.	90	None	87	4.0
Youngstown	103	None	88	0
Wheeling	93.5	None	89	56
Cleveland	94.5	+ 3.5	92	0
Buffalo	88.5	None	90.5	0
Birmingham	100	— 2	99	0
New England	83	None	82	10
Cincinnati	100	+ 9	91	44
St. Louis	89.5	None	60.5	14
Detroit	91	None	90	31
Estimated national rate	96.5	— 1.5	92	5

Based on weekly steelmaking capacity of 1,802,476 net tons for 1948; 1,749,928 tons for 1947; 1,762,381 net tons for 1946.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Jan. 24	Jan. 17	Month Ago Dec. 1947	Year Ago Jan. 1947	5 Years Ago Jan. 1943
Finished Steel	$78.41	$78.18	$76.15	$69.59	$56.73
Semifinished Steel	65.10	57.20	57.20	49.98	36.00
Steelmaking Pig Iron	39.16	39.13	36.31	29.56	23.00
Steelmaking Scrap	41.92	41.92	40.13	31.20	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Nov. 1947	3.47536c
Oct. 1947	3.45536c
Nov. 1946	2.87671c
Nov. 1942	2.36750c

* Straight Arithmetical Composites: Computed from average industry-wide base prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading basing points), and on Steelworks Scrap (No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Finished Steel arithmetical composite, dollars per net ton on net ton basis; others, gross ton.

† Finished Steel Weighted Composite: Computed in cents per pound, base prices, weighted by actual monthly shipments of following products, representing 81 per cent of total steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates; standard rails; hot- and cold-rolled carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Materials

	Jan. 24, 1948	Dec., 1947	Oct., 1947	Jan., 1947
Steel bars, Pittsburgh	2.90c	2.90c	2.90c	2.60c
Steel bars, del. Philadelphia	3.356	3.318	3.30	2.975
Steel bars, Chicago	2.90	2.90	2.90	2.60
Shapes, Pittsburgh	2.80	2.80	2.80	2.46
Shapes, del. Philadelphia	2.968	2.954	2.947	2.60
Shapes, Chicago	2.80	2.80	2.80	2.47
Plates, Pittsburgh	2.95	2.95	2.95	2.61
Plates, del. Philadelphia	3.19	3.17	3.16	2.77
Plates, Chicago	2.95	2.95	2.95	2.62
Sheets, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Pittsburgh	3.95	3.90	3.90	3.55
Sheets, hot-rolled, Gary	2.80	2.80	2.80	2.50
Sheets, cold-rolled, Gary	3.55	3.55	3.55	3.20
Sheets, No. 10 galv., Gary	3.95	3.90	3.90	3.55
Strip, hot-rolled, Pittsburgh	2.80	2.80	2.80	2.50
Strip, cold-rolled, Pittsburgh	3.55	3.55	3.55	3.20
Bright basic, bess. wire, Pittsburgh	3.675	3.675	3.675	3.425
Wire nails, Pittsburgh	4.70	4.625	4.25	4.062
Tin plate, per base box, Pittsburgh	$6.70	$5.75	$5.75	$5.75

Semifinished

Sheet bars, Pittsburgh, Chicago	$60.00	$60.00	$60.00	$47.60
Slabs, Pittsburgh, Chicago	47.50	47.50	47.50	41.40
Rerolling billets, Pittsburgh	47.50	47.50	47.50	41.40
Wire rod 7/32 to ¼-inch, Pitts.	3.05c	3.05c	2.925c	2.55c

Pig Iron

	Jan. 24, 1948	Dec., 1947	Oct., 1947	Jan., 1947
Bessemer, del. Pittsburgh (N.&S. sides)	$40.996	$37.913	$37.879	$31.815
Basic, Valley	39.00	36.00	36.00	30.00
Basic, eastern del. Philadelphia	42.004	38.84	38.78	31.99
No. 2 fdry., del. Pgh. (N.&S. sides)	40.496	37.413	37.379	31.315
No. 2 fdry., del. Philadelphia	42.504	39.34	39.28	32.49
No. 2 foundry, Chicago	39.00	36.00	36.00	30.50
No. 2 Foundry, Valley	39.50	36.50	36.50	30.50
Southern No. 2, Birmingham	37.88	34.88	34.88	26.88
Southern, No. 2, del. Cincinnati	40.74	37.74	38.544	31.75
Malleable, Valley	39.50	36.50	36.50	30.50
Malleable, Chicago	39.50	36.50	36.50	30.50
Charcoal, low phos., fob Lyles, Tenn.	55.00	50.00	46.40	37.50
Ferromanganese, fob cars, Pittsburgh	151.00	151.00	151.00	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$40.50	$40.00	$39.90	$32.50
Heavy melt. steel, No. 2, E. Pa.	46.00	41.625	39.50	31.00
Heavy melt. steel, No. 1, Chicago	39.25	38.75	39.55	30.00
Heavy melt, steel, No. 1, Valley	40.25	39.75	39.50	32.50
Heavy melt. steel, No. 1, Cleveland	39.75	39.25	38.25	31.88
Heavy melt. steel, No. 1, Buffalo	43.50	42.50	39.00	30.88
Rails for rerolling, Chicago	60.00	58.625	51.00	36.25
No. 1 cast, Chicago	63.50	55.875	46.40	41.50

Coke

Connellsville, beehive furnace	$12.50	$12.25	$12.15	$8.81
Connellsville, beehive foundry	14.75	14.50	14.50	9.81
Chicago, oven foundry, del.	19.10	18.60	18.52	15.95

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $45-$50, sales by smaller interests on negotiated basis at $85 or higher.

Forging Quality Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, $55-58; Detroit, del., $61.20; eastern Mich., $62.60.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69.20, eastern Mich., $70.60.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Youngstown, $60; sales in open market $95-$105.

Skelp: Pittsburgh, Youngstown, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69-70.

Wire Rods: Pittsburgh, Chicago, Birmingham, 7/32 to ¼-inch., inclusive, $2.80-3.30 per 100 lb. 7/32 to 47/64-in., inclusive, $2.75, Cleveland; Galveston, $2.95; Worcester, $2.90-2.95. San Francisco (base del.), $3.52.

Bars

Hot-Rolled Carbon Bars (O.H. only) and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, base, 20 tons one size, 2.90c; Detroit, del., 3.06c; eastern Mich., 3.13c; New York, del., 3.351c; Phila., del., 3.356c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.85c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.46c; eastern Mich., 3.53c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.71c; Toledo, 3.78c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.26c; eastern Mich., 4.33c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo. Prices upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c, double refined 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Granite City, 3.175c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; Philadelphia, del., 3.04c; New York, del., 3.172c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent).

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Granite City, 3.65c; Detroit, del., 3.71c; Eastern Mich., del., 3.78c; New York, del., 4.001c; Philadelphia, del., 4.006c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, 3.95c; Youngstown, Sparrows Point, Canton, Middletown, base, 3.95c; Granite City, 4.05c; New York, del., 4.322c; Philadelphia, del., 4.19c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc; corrugated 10 cents extra) Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c Granite City 4.65c and 5.00c, respectively. Los Angeles (base, del.), 5.24c; San Francisco (base, del.), 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Stainless-Clad 20%: Pittsburgh, Washington, Coatesville, Pa., No. 304, 22.00c; No. 410, 20.00c; No. 430, 20.50c; No. 446, 27.00c. Prices include annealing and pickling.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 3.95c; Granite City, 4.05c; Detroit, del., 4.11c; eastern Mich., 4.18c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c. Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c. Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.96c; eastern Mich., del., 3.03c; San Francisco (base, del.), 3.605c; Los Angeles (base, del.), 3.60c.

Cold-Rolled Strip: 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.71c; eastern Mich., 3.78c; Worcester, base, 3.75c-4.45c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.05, 7.15c; over 1.05 to 1.35, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., per base box of 100 lb, 1.25 lb coating $6.60, 1.50 lb coating $6.80; Granite City, Birmingham, Sparrows Point, 1.25 lb coating $6.70, 1.50 lb coating $6.90.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.25 lb tin, $5.80; 0.50 lb tin, $6.00; 0.75 lb tin $6.20; Granite City, Birmingham, Sparrows Point, $5.90, $6.10, $6.30, respectively.

Can Making Black Plate: Pittsburgh, Gary, Warren, O., per base box of 100 lb, 0.55 to 0.70 lb tin, $5.20; 0.75 to 0.95 lb tin, $5.10; 100 to 128 lb tin, $5.20.

Holloware Enameling Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage, 4.75c per lb; Granite City, Birmingham, Sparrows Point, 4.85c per lb.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, per base box of 100 lb, $5.90; Granite City, Birmingham, Sparrows Point, $6.00.

Roofing Ternes: Pittsburgh, per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, 3.40c; Claymont, 3.65c; Geneva, Utah, (base, del.), 3.125c; Det., del., 3.21c; New York, del. 3.322c; Phila., del., 3.19c; Boston, del., 3.423c; St. Louis, del. 3.269c; San Francisco and Los Angeles, del., 3.67c for sizes and grades produced at Geneva, 3.76c for sizes and grades produced at Fontana, Calif.
(Central Iron & Steel Co., Harrisburg, Pa. 4.75c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; **monel-clad, 24.00c. Pittsburgh, Washington,** Coatesville, Pa., 20% stainless-clad, base prices including annealing and pickling: No. 304, 24.00c; No. 410, 22.00c; No. 430, 22.50c; No. 446, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.088c; Phila., del., 2.968c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.41c-3.47c for sizes produced at Torrance, Calif., beyond sizes at Geneva; Los Angeles and San Francisco, del., 3.52c for sizes produced at Geneva; San Francisco, del., 3.41c for sizes produced at Fontana, Calif.

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads	
Bright, basic or bessemer	**$3.55-3.80
Spring (except Birmingham)	†$4.60
Wire Products to Trade in carloads	
Wire, Merchant Quality	
Annealed (6 to 8 base)	††$4.20
Galvanized (6 to 8 base)	††$4.65
(Fob Pittsburgh, Chicago, Duluth, Birmingham, per base column).	
Nails	
Standard, cement-coated, galvanized	‡94
Staples, polished and galvanized	‡94
Woven fence, 15 gage and heavier	‡100
Barbed wire, 80-rod spool	‡‡113
Fence Posts (with clamps)	107
Bale ties, single loop	99

** Worcester, $3.65, Duluth, $3.60, base, San Francisco (base, del.), $4.56, bright basic only.

† Worcester $4.70, Duluth and Trenton, N. J., $4.85, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

‡ Worcester 100; San Francisco (base, del.) 115.

§ San Francisco (base del.) 123.

‡‡ San Francisco (base del.) 133.

†† Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed, $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66 galvanized.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $60-$65 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.65 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars $3.85 per 100 lb, fob mill. Standard spikes, 4.85c; screw spikes, 6.75c. Axles, 4.50c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

Boiler Tubes: Net base prices per 100 ft, fob Pittsburgh, in carload lots, minimum wall thickness, cut lengths 4 to 24 feet, inclusive.

O.D.		——Seamless——		—Elec. Weld—	
Sizes	B.W.G.	Hot Rolled	Cold Drawn	Hot Rolled	Cold Drawn
1"	13	....	$11.87	$11.51	$11.51
1¼"	13	....	14.06	11.48	13.64
1½"	13	$13.08	15.69	12.69	15.22
1¾"	13	14.88	17.85	14.43	17.31
2"	13	16.67	19.99	16.17	19.39
2¼"	13	18.58	22.29	18.02	21.62
2½"	12	20.47	24.54	19.86	23.80
2¾"	12	22.42	26.87	21.75	26.06
2¾"	12	23.76	28.48	23.05	27.63
3"	12	24.93	29.90	24.18	29.00
3¼"	11	29.03	34.81	28.16	33.77
3½"	11	31.17	37.39	30.23	36.27
4"	10	38.69	46.38	37.53	44.99
4½"	9	51.28	61.50	....	....
5"	9	59.39	71.18	....	....
6"	7	91.13	109.27	....	....

Pipe Cast Iron: Class B, 6-in. and over $74.50 per net ton, Birmingham; $79.50, Burlington, N. J.; $86.12, del. Chicago; 4-in. pipe, $5 higher; class A pipe, $5 a ton over Class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	45 off
⅝ and ⅝ x 6-in. and shorter	46 off
¾-in. and larger x 6-in. and shorter	43 off
All diameters longer than 6-in.	41 off
Tire bolts	35 off
Step bolts	43 off
Plow bolts	54 off
Lag bolts	
All diameters 6 in. and shorter	46 off
All diameters longer than 6 in.	44 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅛-in. and smaller	46 off	....
½-in. and smaller	....	44 off
½-in.-1-in.	44 off	....
⅝-in.-1-in.	....	43 off
1⅛-in.-1½-in.	42 off	41 off
1⅝-in. and larger	....	35 off

Additional discount of 15 for full containers.

Hexagon Cap Screws
(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	53 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	48 off
¾, ⅞, & 1 x 6 and shorter	44 off

Square Head Set Screws

Upset 1-in. and smaller	57 off
Headless, ¼-in. and larger	40 off
No. 10 and smaller	52 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural ½-in. and larger	5.65c
Lebanon, Pa.	5.80c
⅛-in. and under	55 off
Lebanon, Pa.	55 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl **$1-$2 off**

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, Per lb
18.00	4	1	...	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
†501	9.00	13.00	17.50	13.00	18.50
†502	10.00	14.50	18.50	14.50	19.50
‡STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

† Low chromium. ‡ Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., base	$40.00	$40.50	$41.00	$41.50
Newark, N. J., del.	42.208	42.708	43.208	43.708
Brooklyn, N. Y., del.	....	44.10	44.60	....
Philadelphia, del.	42.004	42.504	43.004	43.504
Birmingham, base	35.88†	36.38†	....	....
Cincinnati, del.	....	40.74	....	....
Buffalo, base	40.00†	40.00†	40.50†	41.00
Boston, del.	47.776	47.776	48.276	....
Rochester, del.	42.22	42.22	42.72	43.22
Syracuse, del.	43.025	43.025	43.525	44.025
Chicago, base	38.50	39.00	39.50	40.00
Milwaukee, del.	40.08	40.58	41.08	41.58
Muskegon, Mich., del.	....	43.60	44.10	....
Cleveland, fob furnace	38.50†	39.00†	39.50†	40.00
Akron, del.	40.50	41.00	41.50	42.00
Duluth, base	39.00	39.50	40.00	40.50
Erie, Pa., base	38.50	39.00	39.50	40.00
Everett, Mass., base	....	45.00	45.50	....
Granite City, Ill., base	39.50	40.00	40.50	....
St. Louis, del.	40.33	40.83	....	....
‡Neville Island, Pa., base	39.00	39.50	39.50	40.00
Pittsburgh, del., N.&S. Sides	39.996	40.496	40.496	40.996
Provo, Utah, base	39.00	39.50	....	....
Seattle, Tacoma, Wash., del.	....	46.63	....	....
Portland, Oreg., del.	....	46.63	....	....
Sharpsville, Pa., base	39.00	39.50	39.50	40.00
Steelton, Pa., base	40.00	40.50	41.00	41.50
Struthers, O., base	39.50	....	....	....
Swedeland, Pa., base	45.00	45.50	46.00	46.50
Toledo, O., base	38.50	39.00	39.50	40.00
Cincinnati, del.	42.70	43.20	....	....
Youngstown, O., base	39.00	39.50	39.50	40.00
Mansfield, O.	42.57	43.07	43.07	43.57

† Republic Steel Corp. quotes $3 a ton higher at Birmingham, effective Jan. 1, 1948; Republic quotes $2 higher for No. 2 foundry and malleable and $1.50 higher for basic at Buffalo, and $1.25 higher at Cleveland, effective on shipments during week ended Jan. 25.

‡ To Neville Island base add: 79.2c for McKees Rocks, Pa., $1.212 Lawrenceville, Homestead, McKeesport, Monaco; $1.788 Oakmont; $1.596 Verona; $1.788 Brackenridge; 99.6c to Ambridge and Aliquippa.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)....$47.50

6.51-7.00..	$48.75	9.01- 9.50.	55.00
7.01-7.50..	50.00	9.51-10.00.	56.25
7.51-8.00..	51.25	10.01-10.50.	57.50
8.01-8.50..	52.50	10.51-11.00.	58.75
8.51-9.00..	53.75	11.01-11.50.	60.00

Fob Jackson, O., per gross ton; Buffalo base $3.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $77.50, Jackson, O.; $78.75, Niagara Falls; $78 open-hearth and $79 foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus.
Fob furnace, Lyles, Tenn...$55.00
(For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $39.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $46.00. Philadelphia, $48.592, delivered. Intermediate phosphorus, Central furnace, Cleveland, $42.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price per Net Ton

Beehive Ovens

Connellsville, furnace	$12.00-$13.00
Connellsville, foundry	14.00- 15.50
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$18.75
Chicago, outside del.	18.00
Chicago, del.	19.10
Terre Haute, del.	18.05
Milwaukee, ovens	18.75
New England, del.	19.60
Birmingham, del.	15.76
Indianapolis, ovens	17.50
Cincinnati, del.	18.95
Ironton, O., ovens	16.75
Erie, Pa., del.	19.45
Painesville, O., ovens	18.10
Cleveland, del.	19.60
Buffalo, del.	19.85
Detroit, del.	19.35
Philadelphia, ovens	17.75
Swedeland, Pa., ovens	17.75
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	16.25
Pittsburgh, del.	18.31

Coal Chemicals

Spot, cents per gallon

Pure and 90% benzol	21.00†
Toluol, two degrees	28.00
Industrial xylol	28.00
Solvent naphtha	28.00

Per pound fob works

Phenol (car lots, returnable drums)	12.50
Do., less than carlots	13.25
Do., tank cars	11.50

Eastern plants, per pound

Naphthalene flakes, balls, bbl. to jobbers, "household use"	11.00

Per ton, bulk, fob plants

Sulphate of ammonia	$40.00

† Freight allowed up to 2 cents.

Refractories

Per 1000, fob shipping point

Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$92.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	73.00
Ala., Ga.	73.00
N. J.	78.00

Intermediate Heat Duty

Ohio	67.00
Pa., Ill., Md., Mo., Ky.	67.00
Ala., Ga.	59.00
N. J.	70.00

Low-Heat Duty

Pa., Md., Ohio	59.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	50.00
Wire Cut	48.00

Malleable Bung Brick

All bases	83.00

Silica Brick

Pennsylvania	73.00
Joliet, E. Chicago	82.00
Birmingham, Ala.	73.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	64.00
Chem. bonded chrome	64.00
Magnesite brick	86.00
Chem. bonded magnesite	75.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	27.00
Single bags	31.50

Dolomite

Domestic, dead-burned, bulk, net ton, fob Billmeyer, Blue Bell or Williams, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg or Woodville, O., $11.05; Midwest (fob Thornton or McCook, Ill.), add $0.10; Missouri Valley (fob Dolly Siding, and Bonne Terre, Mo.), add $0.20.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% contract	15.20

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%.	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 65.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	28.50
50% no ratio	29.50
Brazilian—nominal	
44% to 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., Mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $35; less than 60% $32.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.30	5.30†	5.30†	5.30	...	...	...	...	...
Shapes, structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	....	4.45	4.45

†Nax High Tensile, produced by Great Lakes Steel Corp., quoted 10 cents higher.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½"& up	H-R Alloy (**4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ⅝" & Thicker
Boston (city)	4.96	6.03[4]	5.73[4]	6.16[4]	7.41[4]	5.04	6.73	4.95	5.63	7.22	4.82	5.11	6.79
New York (city)	4.96	6.18	5.88	6.16	7.41	5.59	....	5.08	5.63	7.23	4.78	5.11	6.82
New York (country)	4.81	6.03	5.73	6.01	7.26	5.44	....	4.93	....	....	4.63	4.96	6.67
Philadelphia (city)	4.71	6.33	5.93	5.91	7.16	4.83	5.73	4.88	5.58	7.17[9]	4.57	4.86	6.33
Philadelphia (country)	4.61	6.23	5.83	....	....	4.73	5.63	4.78	....	....	4.47	4.76	6.23
Baltimore (city)	4.33†	5.96	5.66	5.73	6.98	4.81	....	4.86	5.56	....	4.73	4.78	6.31
Baltimore (country)	4.23†	5.86	5.56	5.50	6.75	4.71	....	4.76	....	....	4.63	4.68	6.21
Washington (city)	4.81	....	....	....	....	5.05	....	5.14	5.79[12]	....	4.95	5.03	6.60
Washington (country)	4.71	....	....	....	....	4.95	....	5.04	....	....	4.85	4.93	6.50
Norfolk, Va.	4.90	....	....	....	....	....	....	5.20	6.00	....	5.15	5.15	6.90
Memphis, Tenn. (city)	4.82[30]§§	5.87[30]†	....	6.37	....	5.02[30]	....	4.97[30]	5.87	....	4.97[30]	5.17[30]	6.87[30]
Memphis, Tenn. (country)	4.72[30]§§	5.77[30]†	....	6.27	....	4.92[30]	....	4.87[30]	5.77	....	4.87[30]	5.07[30]	6.77[30]
Buffalo (city)	4.45	....	5.20[5]	6.05	....	5.25	5.65	4.40	5.10	6.85	4.40	5.00	6.25
Buffalo (country)	4.30	....	5.05[5]	5.50	....	4.70	5.50	4.25	4.95	6.85	4.25	4.45	5.75
Pittsburgh (city)	4.25§§	....	5.10[6]†	5.65	6.90	4.35	5.35	4.40	5.10	6.85	4.40	4.60	5.90
Pittsburgh (country)	4.10§§	....	4.95[6]†	5.50	6.75	4.20	5.20	4.25	4.95	6.85	4.25	4.45	5.75
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.81	7.06	4.55	5.35	4.40	5.10	6.85	4.68	4.60	6.18
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.45	....
Cincinnati	4.75	5.61[8]	5.31	5.76	....	4.79	....	4.79	5.49	....	4.84	4.99	6.34
Detroit	4.55	....	5.30	....	....	4.72	5.63	4.50	5.22	7.10	4.77	4.88	6.28
Indianapolis	4.55	5.32[8]	....	5.87	7.12	4.65	5.90	4.70‡‡	5.40	8.85	4.70	4.90	6.35
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.45	4.40	5.10	6.85[9]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[8]	5.05[8]	5.50	6.75	4.20	5.30	4.25	4.95	6.85[9]	4.25	4.45	5.90
Milwaukee	4.658	5.708[8]	5.408[8]	5.858	7.108	4.558	5.658	4.608	5.308	7.208[9]	4.608	4.808	6.258
St. Louis	4.78	5.83[9]	5.53[9]	6.02	7.27	4.68	5.82	4.73	5.47[12]	....	4.73	4.93	6.38
Birmingham (city)	4.45[30]§§	....	....	5.65	....	4.45[30]	....	4.40[30]	5.93[32]	....	4.40	4.65	6.86
Birmingham (country)	4.30[30]§§	....	....	5.50	....	4.30[30]	....	4.25[30]	....	....	4.25	4.50	....
New Orleans	4.98[30]**	....	6.29[10]	....	....	5.18[30]	....	5.13[30]††	6.29[11]	....	5.03[30]††	5.33[30]	7.29[30]
Omaha, Nebr.	5.462	....	....	6.662	7.912	5.362	....	5.412	6.112	7.562	5.412	5.612	7.062
Houston, Tex.	5.50	....	....	5.50	7.70	5.25	....	5.30	6.80[12]	7.70	5.85	5.35	6.50
Los Angeles (city)	5.75	7.75[8]	7.45[8]	7.40	8.80	6.05	8.70	5.50	7.35[23]	9.35[16]	5.35	5.55	7.65
Los Angeles (country)	5.60	7.60[8]	7.30[8]	7.25	8.65	5.90	8.55	5.35	7.20[1]	9.20[16]	5.20	5.40	7.50
San Francisco	5.20[21]	6.65[8]	....	6.85[8]	7.75[8]	5.75[21]	8.70[13]	5.05[21]	7.00[13]	9.35	5.20[21]	5.30[21]	7.10[21]
Seattle, Tacoma, Wash.	5.30[17]§§	....	7.10[3]‡	6.70	....	5.60[11]	....	5.45[17]	7.45[19]	8.50[13]	5.25[17]	5.45[17]	7.55[17]
Portland, Oreg.	5.30[17]§§	....	7.10[3]‡	6.70	....	5.60[17]	....	5.45[17]	7.45[19]	....	5.25[17]	5.45[17]	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 9999 lb; [19]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [30]—400 to 3999 lb; [21]—400 lb and over; [23]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ add 15c for 100 lb for slow moving items; §§18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.). Carload, lump, bulk $145 per gross ton of alloy, carload packed $157, ton lot $172, less ton $189; fob New Orleans, Mobile, Philadelphia, Baltimore, or New York. Carload, lump, bulk $151, fob cars Pittsburgh, including 50c switching charge. Add, or subtract, $1.80 for each 1%, or fraction thereof, of contained manganese over 82% or under 78%.

West Coast Prices: Carload (80,000 lb or more), lump, bulk, same price and basing points as above. All other prices for shipment from Pacific Coast warehouses, add $26.21 to above prices. Delivery is fob Portland, Los Angeles, South San Francisco, or Seattle warehouses, with railroad freight allowed on shipments of 25 gross tons or more.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Eastern Zone, carload, lump, bulk, max. 0.10% C, 22.5c per lb of contained Mn, carload packed 23.25c, ton lot 24.35c, less ton 25.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Eastern Zone, carload, lump, bulk 16.5c per lb of contained Mn, carload packed 17.25c, ton lot 18.35c, less ton 19.55c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.7c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Eastern Zone, carload, 2" x D, bulk 32c per lb of metal, carload packed 32.5c, ton lot 34c, less ton 36c; Central, add 1c for c.l. and 1.45c for l.c.l.; Western, add 1.45c for c.l. and 2.4c for l.c.l. Freight allowed. Spot, add 2c.

Silicomanganese: (Mn 65-70%). Eastern Zone, contract, lump, bulk, 1.50% C grade, 17-20% Si, 7.8c per lb of alloy, carload packed, 8.55c, ton lot 9.45c, less ton 10.45c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. For 2.0% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Eastern Zone, contract, c.l., lump, bulk 18.6c per lb of contained Cr, c.l., packed 19.5c, ton lot 20.65c, less ton 22.05c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Eastern Zone, contract, c.l., 8MxD, bulk 20.1c per lb of contained Cr, c.l., packed 21.0c, ton lot 22.35c, less ton 24.1c; Central, add 0.4c for c.l. and 1.3c for l.c.l.; Western, add 0.55c for c.l. and 2.1c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Eastern Zone, contract, carload, lump, bulk, max. 0.03% C 28.5c per lb of contained Cr, 0.04% C 27.5c, 0.05% C 27.0c, 0.06% C 26.5c, 0.10% C 26.0c, 0.15% C 25.5c, 0.20% C 25.25c, 0.50% C 25.0c, 1% C 24.5c, 2% C 24.25c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, add C 1.25% max.). Eastern Zone, contract, carload, lump, bulk 25c per lb of contained chromium, carload, packed 26.1c, ton lot 27.3c, less ton 29.1c; Central, add 0.4c for c.l. and 0.65c for l.c.l.; Western, add 0.5c for c.l. and 1.85c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 2c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 2c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Eastern Zone, contract, carload, 1" x D, packed, max. 0.50% C grade, 93c per lb of contained chromium, ton lot 94.5c, less ton 97c; Central, add 1.5c for c.l. and 2.5c for l.c.l.; Western, add 2.75c for c.l. and 4.5c for l.c.l. Freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 9.3c per lb of contained Si, carload packed 10.9c, ton lot 12.35c, less ton 14.0c; Central, add 0.5c for c.l. and 1.25c for l.c.l.; Western, add 0.7c for c.l. and 1.8c for l.c.l. Freight allowed. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.). Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 11.8c per lb of contained Si, carload packed 13.1c, ton lot 14.25c, less ton 15.5c; Central, add 0.3c for c.l. add 0.75c for l.c.l.; Western, add 1.05c for c.l. and 5c for l.c.l. Freight allowed. Spot, add 0.3c.

85% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk 13.3c per lb of contained Si, carload packed 14.55c, ton lot 15.55c, less ton 16.7c; Central, add 0.3c for c.l. and 0.7c for l.c.l.; Western, add 1.05c for c.l. and 4.4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90% Ferrosilicon: Eastern Zone, contract, carload, lump, bulk, 15c per lb of contained Si, carload packed 16.2c, ton lot 17.15c, less ton 18.2c; Central, add 0.3c for c.l. and 0.65c for l.c.l.; Western, add 1c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Over 97% Si and 1% max Fe). Eastern Zone, c.l., lump, bulk, regular, 17.3c per lb of Si, c.l. packed 18.5c, ton lot 19.4c, less ton 20.4c; Central, add 0.6c for c.l. and 2.25c for l.c.l.; Western, add 1.2c for c.l. and 4c for l.c.l. Add 1c for max. 0.20% calcium grade. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade, analyzing over 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract basis fob Niagara Falls, N. Y., lump per lb c.l. 6.90c; ton lots packed, 7.40c; 200 to 1999 lb, 8.15c; smaller lots, 8.65c. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¼ lb each and containing exactly 2 lb of Cr). Eastern Zone, contract, carload, bulk, 12.5c per lb of briquet, carload packed 13.2c, ton lot 14.0c, less ton 14.9c; Central, add 0.25c for c.l. and 0.9c for l.c.l.; Western, add 0.35c for c.l. and 1.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Eastern Zone, contract, carload, bulk, 8.7c per lb of briquet, c.l. packaged 9.5c, ton lot 10.3c, less ton 11.2c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Eastern Zone, contract, c.l., bulk 8.75c per lb of briquet, c.l. packed 9.55c, ton lot 10.35c, less ton 11.25c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.8c for c.l. and 2.5c for l.c.l. Freight allowed. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Eastern Zone, contract, carload, bulk 5.1c per lb of briquet, c.l. packed 5.25c, ton lot 6.7c, less ton 7.6c. **(Small size**—weighing approx. 2½ lb and containing exactly 1 lb of Si). Eastern Zone, carload, bulk 5.25c, c.l. packed 6.05c, ton lot 6.85c, less ton 7.75c; Central, add 0.25c for c.l. and 0.6c for l.c.l.; Western, add 0.45c for c.l. and 0.9c for l.c.l. Freight allowed. Add 0.25c for notching, small size only. Spot, add 0.25c.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Eastern Zone, contract, carload, lump, bulk 17.50c per lb of alloy, carload packed 19.0c, ton lot 19.8c, less ton 20.8c; Central, add 0.5c for c.l. and 0.85c for l.c.l.; Western, add 2.55c for c.l. and 2.6c for l.c.l. Freight allowed. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Eastern Zone, contract, carload, lump, bulk 16.25c per lb of alloy, carload packed 16.45c, ton lot 19.35c, less ton 20.85c; Central, add 0.5c for c.l. and 0.75c for l.c.l.; Western, add 2.55c for c.l. and 2.90c for l.c.l. Freight allowed. Spot, add 0.25c.

VANADIUM ALLOYS

Ferrovanadium: Open Hearth Grade (Va 50-55%, Si 8% max., C 3% max.). Eastern Zone, contract, any quantity, $2.90 per lb of contained Va; Central, add 2c for c.l. and 3c for l.c.l.; Western, add 6c for c.l and 9c for l.c.l. Freight allowed. Spot, add 10c. **Special Grade** (Va 50-55%, Si 4% max., C 1% max.), $3. **High Speed Grade** (Va 50-55%, Si 1.50% max., C .20% max.), $3.10.

Vanadium Oxide: All Zones, contract, less carload lots, $1.20 per lb of contained V_2O_5. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

TITANIUM ALLOYS

Ferrotitanium: (Ti 20-25%, Al 3% max., Si 4% max., C 0.10% max.). Eastern Zone, contract, ton lot, 2" x D, $1.35 per lb of contained Ti, less ton $1.40. (Ti 40-45%, Al 7% max., Si 4% max., C 0.10% max.). Ton lot $1.23, less ton $1.25; Central, add 4c for 20-25% Ti grade, and 2.1c for 40-45% grade; Western, add 13.5c for 20-25% Ti grade, and 7.2c for 40-45% grade. Freight allowed. Spot, add 5c.

Ferrotitanium, High-Carbon: (15-20%). Contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Eastern Zone, contract, 10,000 lb W or more, $2.25 per lb of contained W; 200 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot add 2c.

Tungsten Powder: (W 98.8% min.). Eastern Zone, contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Eastern Zone, contract, c.l., lump, bulk 6c per lb of alloy, c.l. packed 6.75c, ton lot 7.5c, less ton 8.35c; Central, add 0.25c for c.l. and 1.1c for l.c.l.; Western, add 0.6c for c.l. and 3.95c for l.c.l. Freight allowed. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Eastern Zone, contract, carload, lump, packed 18.4c per lb of alloy, ton lot 19.15c, less ton 20.4c; Central, add 0.6c for c.l. and 1.05c for l.c.l.; Western add 3.05c for c.l. and 4c for l.c.l. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Eastern Zone, contract, 100 lb or more, 1" x D, $1.20 per lb of alloy, freight allowed. Less than 100 lb $1.30; Central, add 0.75c; Western, add 2.9c, freight allowed. Spot add 5c.

Borosil: (3 to 4% B, 40 to 45% Si). $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Eastern Zone, contract, ton lot, 2" x D, $2.50 per lb of contained Cb, less ton $2.55; Central, add 1.65c; Western, add 6.45c. Freight allowed. Spot, add 10c.

CMSZ Mixes: No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Eastern Zone, carload, 12 M x D, carload packed 17.25c per lb of material, ton lot 18.00c, less ton 19.25c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Eastern Zone, carload, packed, 1" x D, 39c per lb of alloy, ton lot 41c, less ton 43c; Central, add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Eastern Zone, contract, carload, packed, ½" x 12 M, 15.0c per lb of alloy, ton lot 15.75c, less ton 17.0c; Central add 0.3c for c.l. and 1.1c for l.c.l.; Western, add 0.3c for c.l. and 3.05c for l.c.l. Freight allowed. Spot, add 0.25c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 10c, ton lots 10.25c, smaller lots 10.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus: 17-19% based on 18% P content with unitage of $3 for each 1% of P above or below the base) Gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferromolybdenum: (55-75%). Per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Some Zinc Sellers Advance Prices 1.5 Cents

Prime western now quoted up to 12.00c, East St. Louis. Scrap metal market displays strength

NEW YORK—Some zinc sellers advanced prices 1.50 cents a pound here last week, following an advance of $6 a ton in the price for zinc concentrates. The advance also follows a period during which supplies steadily tightened. With the exception of secondary aluminum and scrap metals, which advanced, other nonferrous metal markets held steady.

Expenditures for procurement of materials for the strategic stockpile in the government's 1949 fiscal year were estimated by President Truman in his budget message at $285 million plus $20 million for processing government-owned stocks prior to stockpiling. In addition, $75 million is requested to be applied to prior contract authorization while $20 million would be used for concellation of Reconstruction Finance Corp. notes. The budget also provides that surplus strategic and critical materials, not to exceed $175 million in value, may be transferred to the stockpile during the 1949 fiscal year. The accumulative total of these transfers will amount to $400 million by the end of 1949.

Zinc—Some sellers, including American Zinc, Lead & Smelting Co., who initiated the move, advanced prime western zinc 1.50 cents a pound on Jan. 21 to 12.00c a pound, East St. Louis. The usual premiums apply to select, brass special, intermediate, high grade and special high grade. This is the first increase since November, 1947. This followed an increase of $6 a ton in the price of zinc concentrates to $78 a ton, Joplin, Mo., which is being paid by Eagle Picher Mining & Smelting Co. Stocks of zinc in all forms held by the Office of Metals Reserve declined 66,607 tons in December to 100,767 tons, including 29,447 tons of refined metal.

COPPER—Activity in the copper market continued to be centered last week in the export section where substantial tonnages were sold on the basis of 21.50c to 21.75c, fas New York. Supplies in the domestic markets are still far short of demand, forcing sellers to allocate supplies carefully at 21.50c, Connecticut, for electrolytic.

LEAD—Consumers' requests for February lead are far in excess of available supplies, which are estimated 10 per cent lower than the total for the current month due to the shorter work period. Sellers are cutting down requests so that available tonnages can be distributed as equitably as possible. Present OMR stocks total about 1600 tons of refined lead. Prices held steady at 14.80c to 14.85c, St. Louis.

TIN—British Ministry of Supply, Colonial Office and the Malayan Chamber of Mines issued a joint statement last week indicating that discussions will be reopened on the question of prices for Malayan tin ore. The price was raised on Dec. 19 by the Ministry from £423 to £500 per ton, but Malayan producers protested the price was still unprofitably low, resulting in a recent lag in shipments from that district. The entire Netherlands East Indies December shipments of 1163 tons of tin in ore again went to the Texas City Tex., smelter, making fourth quarter exports to the United States from that district 3905 tons. The export price of Banka tin is the equivalent of 94.74c to 94.91c per pound, fob Rotterdam. Exports of tin concentrates from Bolivia in 1947 are estimated at 33,791 metric tons of fine tin.

ALUMINUM—Aluminum Co. of Canada Ltd. has increased the price of aluminum ingot 1 cent a pound to 15.00c delivered destination in Canada, or 15.00c, fas Canadian port for export. The company stated that substantially higher costs account for the increased price.

SILVER—Demand for silver in the United States this year is expected to continue at its present high levls, according to Handy & Harman, leading bullion dealers. Total consumption by the arts and industry during 1947 is estimated at 100 million ounces compared with record peacetime consumption of 105 million ounces in 1946. Price holds steady at 74.62½c per fine ounce.

NONFERROUS METAL PRICES

Copper: Electrolytic, carloads 21.50c, delivered Conn.; Lake, 21.62½c del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c 1000-4999 lb; 1½c, 500-999 lb; 2c 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.75-20.50c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.50; No. 1 yellow (No. 405) 15.75-17.00c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50-12.00c, brass special 10.75-12.25c, intermediate 12.50c, E. St. Louis; high grade 11.50-13.00c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 16.00-16.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 16.00-16.75c; grade 2 (92-95%) 15.50-16.50c; grade 3 (90-92%) 15.25-16.25c; grade 4 (85-90% 15.00-15.50c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c, fob Freeport, Tex.; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 to 4000 lb, 35.00-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (including Straits), 94.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 93.85c; Grade C, 99.65-99.79% incl. 93.50c; 99.00-99.64% 93.50c and 98.00-98.99%, 92.60c for tin content.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 224-999 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 33.75c lb; 25 lb pigs produced from electrolytic cathodes 35.25c lb; shot produced from electrolytic cathodes 36.25c lb; "F" nickel shots or ingots for addition to cast iron 34.25c lb. Prices include import duty.

Mercury: Open market, spot, New York, $79-$81 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, 20.50c per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg) $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 74.62½c. per ounce.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

Copper and brass product prices are fob mill, with freight prepaid on 200 lb or more.

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., hot-rolled, 38.44c; nickel silver, 18%, 42.29c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.95c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 26.92c, less carlots 27.42c; weatherproof, fob eastern mills, carlots 27.60c, less carlots 28.10c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles. Pipe: Full coils 17.50c; cut coils 17.75c. Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 5000 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A, B	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.25-18.50, No. 2 copper 17.25-17.50, light copper 16.25-16.50, composition red brass 15.25-15.50, auto radiators 12.00-12.25, heavy yellow brass 11.25, brass pipe 12.00-12.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 19.00, No. 2 copper 18.00, light copper, 17.00, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 15.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 17.00-17.50, No. 2 16.00-16.50, light copper 14.50-15.00, No. 1 composition red brass 12.75-13.25, No. 1 composition turnings 12.25-12.75, mixed brass turnings 8.00-8.50, new brass clippings 12.75-13.25, No. 1 brass rod turnings 10.00-10.50, light brass 6.50-7.00, heavy yellow brass 9.00-9.25, new brass rod ends 10.50-11.00, auto radiators, unsweated 10.25-10.75, cocks and faucets 10.50-10.75, brass pipe 10.00-10.25.

Lead: Heavy 12.00-12.50, battery plates 7.00-7.25, linotype and stereotype 14.50-15.00, electrotype 12.00-12.50, mixed babbitt 13.50-14.00, solder joints 16.50-17.00.

Zinc: Old zinc 5.00-5.25; new die cast scrap 4.50-5.00, old die cast scrap 2.50-3.00.

Tin: No. 1 pewter 60.00-62.00, block tin pipe 77.00-78.00, auto babbitt 45.00-47.00, No. 1 babbitt 45.00-48.00, siphon tops 45.00-47.00.

Aluminum: Clippings, 2S 9.00-9.50, old sheets 7.00-7.50, crankcases 7.00-7.50, borings and turnings 2.50-3.00, pistons, free of struts, 6.00-6.50.

Nickel: Anodes 16.00-17.00, turnings 12.50-13.00, rod ends 16.00-17.00.

Monel: Clippings 12.00-12.50, turnings 7.00-7.25, old sheets 10.00-10.50, rods 10.00-10.50, castings 9.00.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. Average..	21.50	14.825	10.50	85.704	15.00	33.00	35.00	74.625
Jan. 1-20	21.50	14.80–14.85	10.50	94.00	15.00	33.00	33.75	74.625
Jan. 21-22 ...	21.50	14.80–14.85	10.50–12.00	94.00	15.00	33.00	33.75	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, fob Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$40.50
No. 2 Heavy Melt. Steel	40.50
No. 1 Busneling	40.50
Nos. 1, 2 and 3 Bundles	40.50
Machine Shop Turnings	36.00-36.50
Mixed Borings, Turnings	36.00-36.50
Short Shovel Turnings	37.00-37.50
Cast Iron Borings	37.00-37.50
Bar Crops and Plate	47.50-48.00
Low Phos. Steel	47.50-48.00
Heavy Turnings	40.50-41.00

Cast Iron Grades

No. 1 Cupola	58.00-59.00
Charging Box Cast	45.00-47.00
Heavy Breakable Cast	43.00-45.00
Unstripped Motor Blocks	50.00-51.00
Malleable	69.00-70.00
Brake Shoe	50.50-51.00
Clean Auto Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.00
R.R. Malleable	69.00-70.00
Axles	51.50-52.00
Rails, Rerolling	54.50-55.00
Rails, Random Lengths	52.50-53.00
Rails, 3 ft and under	54.00-54.50
Rails, 18 in. and under	55.00-55.50
Railroad Specialties	55.00-56.00
Uncut Tires	52.00-52.50
Angles, Splice Bars	53.00-54.00

CLEVELAND

No. 1 Heavy Melt. Steel	$39.50-40.00*
No. 2 Heavy Melt. Steel	39.50-40.00*
No. 1 Busheling	39.50-40.00*
Nos. 1 & 2 Bundles	39.50-40.00*
Machine Shop Turnings	34.50-35.00
Mixed Borings, Turnings	34.00-36.00
Short Shovel Turnings	35.50-36.00
Cast Iron Borings	35.50-36.00
Bar Crops and Plate	44.50-45.00
Punchings & Plate Scrap	44.50-45.00
Heavy Turnings	39.50-40.50
Alloy Free Turnings	37.50-38.50
Cut Structurals	52.50-54.50

* Plus applicable freight springboard.

Cast Iron Grades

No. 1 Cupola	62.00-65.00
Charging Box Cast	58.00-60.00
Stove Plate	58.00-60.00
Heavy Breakable Cast	58.00-60.00
Unstripped Motor Blocks	58.00-59.00
Malleable	70.00-75.00
Brake Shoes	54.00-55.00
Clean Auto Cast	64.00-65.00
No. 1 Wheels	60.00-61.00
Burnt Cast	58.00-59.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.50-41.50*
R.R. Malleable	70.00-75.00
Rails, Rerolling	60.00
Rails, Random Lengths	59.00-60.00
Rails, 3 ft and under	63.00-65.00
Cast Steel	58.00-60.00
Railroad Specialties	53.00-55.00
Uncut Tires	56.00-57.00
Angles, Splice Bars	61.00-62.00

* Earmarked material; open market price $48.50-$49.50.

VALLEY

No. 1 Heavy Melt. Steel	40.00-40.50*
No. 2 Heavy Melt. Steel	40.00-40.50*
No. 1 Bundles	40.00-40.50*
Machine Shop Turnings	34.50-35.50
Short Shovel Turnings	36.50-37.00
Cast Iron Borings	36.00-36.50
Low Phos.	48.50-49.00

* Plus applicable freight springboard.

Railroad Scrap

No. 1 R.R. Heavy Melt	40.50-41.50*

* Earmarked for return to steel supplier. Price in open market, $48.50-$49.50.

MANSFIELD

Machine Shop Turnings	37.00-38.00
Short Shovel Turnings	37.00-38.00

CINCINNATI

No. 1 Heavy Melt. Steel	$39.50
No. 2 Heavy Melt. Steel	39.50
No. 1 Busheling	39.50
No. 1 Bundles	39.50
No. 2 Bundles	39.50
Machine Shop Turnings	33.50
Mixed Borings, Turnings	32.50
Short Shovel Turnings	35.50
Cast Iron Borings	34.50

Cast Iron Grades

No. 1 Cupola Cast	55.00
Charging Box Cast	43.00
Heavy Breakable Cast	50.00
Stove Plate	47.00
Unstripped Motor Blocks	45.00
Brake Shoes	45.00
Clean Auto Cast	55.00
Drop Broken Cast	60.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	42.00
R.R. Malleable	68.00
Rails, Rerolling	58.00
Rails, Random Lengths	56.00
Rails, 18 in. and under	60.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1 & 2 Bundles	35.00-35.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	29.00-29.50
Mixed Borings, Turnings	29.00-29.50
Short Shovel Turnings	30.00-30.50
Cast Iron Borings	30.00-30.50
Punchings & Plate Scrap	41.00-41.50

Cast Iron Grades

No. 1 Cupola Cast	60.00-62.00
Heavy Breakable Cast	50.00-52.00
Clean Auto Cast	62.00-65.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.50-44.50
No. 2 Heavy Melt. Steel	41.00-42.00
No. 1 Busheling	41.00-42.00
No. 1 & 2 Bundles	41.00-42.00
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Cast Iron Borings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Low Phos.	47.00-48.00
Elec. Furnace Bundles	44.00-45.00

Cast Iron Grades

No. 1 Cupola	58.00-60.00
Mixed Cupola	54.00-56.00
Heavy Breakable Cast	51.00-52.00
Malleable	70.00-75.00
No. 1 Wheels	52.00-54.00
Clean Auto Cast	58.00-60.00

Railroad Scrap

Rails, 3 ft. and under	51.00-53.00
Railroad Specialties	50.00-51.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$46.00*
No. 2 Heavy Melt. Steel	41.00-42.00*
No. 1 Busheling	41.00-42.00*
No. 1, No. 2 Bundles	41.00-42.00*
No. 3 Bundles	39.00-40.00*
Machine Shop Turnings	34.50-35.50
Mixed Borings, Turnings	34.50-35.50
Short Shovel Turnings	36.00-37.00
Bar Crop and Plate	47.50
Punchings & Plate Scrap	47.50
Cut Structurals	47.50
Elec. Furnace Bundles	44.50-45.50
Heavy Turnings	43.00-44.00
No. 1 Chemical Borings	41.50-42.50

Cast Iron Grades

No. 1 Cupola Cast	56.00-57.00
No. 1 Machinery Cast	58.00-60.00
Charging Box Cast	55.00-56.00
Heavy Breakable Cast	55.00-56.00
Unstripped Motor Blocks	52.00-53.00
Malleable	70.00-72.00
Clean Auto Cast	57.00-58.00
No. 1 Wheels	60.00-62.00

* Nominal.

NEW YORK

(Brokers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.03*
No. 2 Heavy Melt. Steel	34.03*
No. 1 Busheling	34.03*
Nos. 1 & 2 Bundles	34.03*
No. 3 Bundles	32.03*
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	29.00-30.00
Short Shovel Turnings	31.00-32.00
Punchings & Plate Scrap	40.00
Cut Structurals	40.00
Elec. Furnace Bundles	40.00

* Nominal.

Cast Iron Grades

No. 1 Cupola Cast	51.00-52.00
Charging Box Cast	51.00-52.00
Heavy Breakable	50.00-51.00
Unstripped Motor Blocks	47.50-48.50
Malleable	60.00-62.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.50
No. 2 Heavy Melt. Steel	31.50-32.50
No. 1 Bundles	31.50-32.50
No. 1 Busheling	31.50-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	28.00-29.00
Short Shovel Turnings	28.50-29.50
Bar Crops and Plate	33.00-34.00
Punchings & Plate Scrap	33.00-34.00
Chemical Borings	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	46.00-47.00
Charging Box Cast	40.00-41.00
Heavy Breakable Cast	47.00-48.00
Stove Plate	46.00-47.00
Unstripped Motor Blocks	41.00-42.00
Clean Auto Cast	44.00-45.00

CHICAGO

No. 1 Heavy Melt. Steel	$39.00-39.50
No. 2 Heavy Melt. Steel	39.00-39.50
Nos. 1 & 2 Bundles	39.00-39.50
No. 3 Bundles	37.00-37.50
Machine Shop Turnings	34.00-34.50
Mixed Borings, Turnings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Cast Iron Borings	35.00-35.50
Bar Crops and Plate	45.00-45.50
Punchings	50.00-50.50
Elec. Furnace Bundles	40.00-40.50
Heavy Turnings	38.50-39.00
Cut Structurals	44.00-44.50

Cast Iron Grades

No. 1 Cupola Cast	62.00-65.00
Clean Auto Cast	62.00-65.00
No. 1 Wheels	53.00-56.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	48.00-48.50
Malleable	72.00-74.00
Rails, Rerolling	59.00-61.00
Rails, Random Lengths	54.00-55.00
Rails, 3 ft and under	62.00-63.00
Rails, 18 in. and under	64.00-65.00
Railroad Specialties	57.00-58.00
Angles, Splice Bars	61.00-62.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$38.00-39.00
No. 2 Heavy Melt. Steel	37.50-38.50
Machine Shop Turnings	31.00-33.00
Short Shovel Turnings	33.00-34.00

Cast Iron Grades (Fob shipping point)

No. 1 Cupola Cast	55.00-60.00
Mixed Cast	54.00-56.00
Heavy Breakable Cast	43.00-45.00
Brake Shoes	46.00-47.00
Clean Auto Cast	56.00-61.00
Burnt Cast	47.00-49.00

Railroad Scrap

R.R. Malleable	62.00-63.50
Rails, Rerolling	58.00-61.00
Rails, Random Lengths	53.00-55.00
Rails, 3 ft and under	56.00-58.00
Uncut Tires	46.00-47.00
Angles, Splice Bars	48.00-49.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$37.00
No. 2 Heavy Melt. Steel	37.00
No. 1 Busheling	37.00
Nos. 1 & 2 Bundles	37.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	51.00
Stove Plate	43.00
No. 1 Wheels	45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	45.00
Axles, Steel	39.00
Rails, Rerolling	52.00
Rails, Random Length	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*25.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.50
Bar Crops and Plate	25.00
Cast Steel	25.00
Alloy Free Turnings	15.50
Cut Structurals	25.00
Tin Can Bundles	20.00

Railroad Scrap

No. 1 Heavy Melting	26.00
Axles	32.00
Rails, Random Lengths	26.50
Uncut Tires	33.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	24.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	22.00
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	24.50
Cut Structurals	24.50

Cast Iron Grades

No. 1 Cupola Cast	30.00
Charging Box Cast	25.00
Heavy Breakable Cast	24.00
Stove Plate	25.50
Unstripped Motor Blocks	24.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	30.00
No. 1 Wheels	26.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Railroad Malleable	30.00
Rails, Random Lengths	21.50
Angles and Splice Bars	23.00

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	25.00
Machine Shop Turnings	16.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	28.00
Elec. Furnace Bundles	28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00

HAMILTON, ONT.

(Ceiling prices, delivered)

Heavy Melting	$22.00
No. 1 Bundles	22.00
Mechanical Bundles	20.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.00
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	42.00-43.00
No. 2 Cast	35.00-37.00

* Removed from price control Aug. 9, 1947; quoted on basis of fob shipping point.

PICK UP EXTRA SAVINGS with "CRANEPOWER" in '48

Scores of plants have picked up important savings right in their yards this past year by substituting "cranepower" for manpower in material handling operations. And the size of such operations does not have to be large for a Lorain Crane to return big savings.

This single-engine Lorain Self-Propelled TL-20 crane is handling castings and forgings with an electric magnet, in a Detroit automobile plant. It is one-man operated; travels to all parts of the yard at speeds up to 7 MPH; can be equipped with more than 15 different crane attachments to meet every material handling need. And its efficiency is never affected by weather or long working hours.

There's a crawler or rubber-tire mounted Lorain Crane of a type and size to meet your specific requirements. New catalog "Lorains In Industry" offers pictorial proof of "cranepower's" savings. Ask your local Thew-Lorain distributor for a free copy today.

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Sheets, Strip . . .

Second quarter quotas expected to be lower, with mills working on arrearages

Sheet Prices, Page 100

New York — As a result of various production difficulties, most of which are due primarily to shortages of raw materials, some sheet producers now claim that their second quarter consumer quotas will be smaller than for the present period. There is not only the shortage of metallics, but also the stringency in fuel oil and natural gas. Various mills are falling behind on their shipping schedules and believe that as a consequence their arrearages at the end of the current quarter will be heavier than at the beginning, indicating less capacity available for new allotments.

Further, it is believed that the general trade will suffer also from higher and broader priorities that will probably be set up by that time under the proposed voluntary allocation program which is being pressed upon the industry by Washington as an alternate to a mandatory allocation program. The effects may be minimized to some extent by greater rolling capacity and possibly by a freer flow of pig iron and scrap, especially as more favorable weather conditions might affect scrap and as some added capacity might affect pig iron. However, increased rolling facilities, whatever may be added before the end of the first half, will not be able to produce at normal rates because of continued overall shortage of raw materials, and the expectation now is, at least in some quarters, that the general trade may actually be given smaller quotas in the second period than at present.

Pittsburgh — Carnegie-Ilinois Steel Corp. has advanced long ternes $4 a ton to bring its price in line with other producers. All sellers are now quoting on a $4.05 per 100 pound basis; no adjustments were made in extras. Similar action was taken Jan. 22 by Carnegie on enameling sheets in raising prices 5 cents per 100 pounds to $3.95, base, the same level as is quoted by competitors.

Major consumers of sheets and strip are resigned to the fact there just isn't enough tonnage to fulfill all requirements. Some appliance manufacturers have attempted to substitute cold-rolled sheets for enameling stock, but found it impossible to achieve desirable enamel finish. Aluminum also has been substituted for steel and, in some instances, may continue to be used when steel is in greater supply.

Most sheet and strip consumers are against government interference in the present pattern of steel distribution. Reflecting this viewpoint is the resolution passed recently by the National Association of Sheet Metal Distributors, Philadelphia, urging that no legislation be passed which would allow the government to allocate steel products. This group contends that steel mills are at present "equitably" distributing their output, and that "compulsory rationing program would have deterring rather than helpful effect." Some relief for West Coast sheet consumers is indicated in the report that an import and export firm, Yaras & Co., Los Angeles, has arranged for shipment of 25,000 tons of sheets from the Japanese Board of Trade.

Consumers of galvanized sheets, culvert, galvannealed and galvanized formed roofing and siding will have to pay higher coating extras up to $2 per ton depending on gage as a result of the Jan. 21 increase of 1-1/2c a pound to 12 cents, East St. Louis, for slab zinc.

Philadelphia—One sheet producer is expected to announce consumer quotas for second quarter within the next week or so and certain others indicate they will also take reasonably early action. It is considered likely, however, that quotas set up in the near future will be subject to some change as the proposed priority program becomes further advanced. General opinion is that as much or more tonnage will be produced in the second quarter, but that new allotments for most consumers will be smaller than at present due to the demands of the proposed allocation program and to the stepping up of European needs, which may be reflected particularly in indirect requirements for steel.

Cleveland — To permit production to catch up with orders booked for the first quarter of 1948, Republic Steel Corp.'s Cleveland district will take no orders for April delivery of electrogalvanized sheets but will use that month to complete orders originally booked for delivery before the end of March. Republic also will skip order-taking for April in the Gadsden, Ala., district on all sheets, most of that district's sheet production being galvanized. However, for the first time since the second quarter of 1947 Republic's Canton, O., district has set up order quotas for April on galvanized and galvannealed sheets. In recent months, orders on hand for those products were so far ahead of production that no additional business was booked. District quotas for flat-rolled products on which orders will be taken for April were sent out Jan. 15.

Cincinnati — Demand for sheets has shown no evidence of diminishing. District mills are following custom in accepting tonnage on a quarterly basis only and are not yet ready to make up second quarter schedules. Reports in this area indicate Sheffield Steel Corp., Kansas City, Mo., and Sheffield Steel of Texas, Houston, are on the verge of shutdowns temporarily through lack of scrap. Mills here are operating at capacity.

Birmingham — With first quarter supplies considerably below needs, sheet users are concerned over prospects for second quarter supplies. Pressure is on mills in full volume again after the holidays, but they hear nothing especially encouraging. Talk of possible price increases still persists.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 101

Pittsburgh—Output of fasteners remains restricted, due to inadequate inventory of steel, notably cold-heading stock of hot-rolled wire rods in coils. No significant improvement in steel deliveries from mills is indicated through the first half of this year. Sellers note a moderate upturn in the volume of new orders, reflecting better balance in customers' inventories. Order backlogs are becoming further extended due to restricted operations. Some interests are promising six to eight months delivery on bolts and nuts under ½-inch. Greater standardization of terminology and abbreviations for numerous fastener products is being advocated. Such a program, if followed on an industry-wide basis, would result in savings in time and money by facilitating preparation of records and expediting ordering, shipping and billing operations.

Plates . . .

Shortages and rising cost of materials forces producers to advance prices

Plate Prices, Page 101

Philadelphia — High cost of raw materials and inability to obtain sufficient quantities to effect highly economic production have forced the Claymont, Del., plate producer to advance prices $5 a ton, to 3.65c a pound, mill. This increase became effective Jan. 22, and follows a $6 increase, as noted in last week's issue, by the Harrisburg, Pa., producer, to 4.75c a pound, basing points.

Pressure for plates remains strong, especially for ¼ and ⅜-inch thicknesses. Some producers believe they will be able to catch up on last quarter arrearages by the end of this month, others say longer time will be required and from the way it now appears they will be forced to carry over into next quarter a substantial tonnage originally promised for shipment before the end of March.

New York — Plate production is being further handicapped, for in addition to shortages of scrap and pig iron there is increasing scarcity of fuel oil and natural gas. At certain plants this latter factor is having a decidedly adverse effect, one which probably will continue as long as severely cold weather prevails.

This situation is not only curbing current shipments but is holding out promise of smaller consumer quotas in the second quarter because of the probable necessity of the mills having to devote more capacity than was the case at the beginning of the current period to catching up on arrearages.

One eastern plate mill recently advanced its export price on plates from $3.66 per hundred pounds fas eastern ports, to $4.25 per hundred pounds.

Birmingham — Plate consumers without exception are receiving less tonnage than they need for current uses. Mills are being flooded with inquiries even though acceptance of tonnage is slow. Indications are that the supply situation will remain tight through the second quarter, possibly through the year, especially if carbuilding holds to its present accelerated pace at Bessemer, Ala.

Seattle — No large tonnages of plates are immediately pending although fabricators have good backlogs of tank and boiler jobs. Material continues very scarce and this condition limits bidding to available supplies.

THE Sides OF A V-BELT ARE WHAT Grip the Pulley, Pick-up the Load AND REALLY Get the Wear!

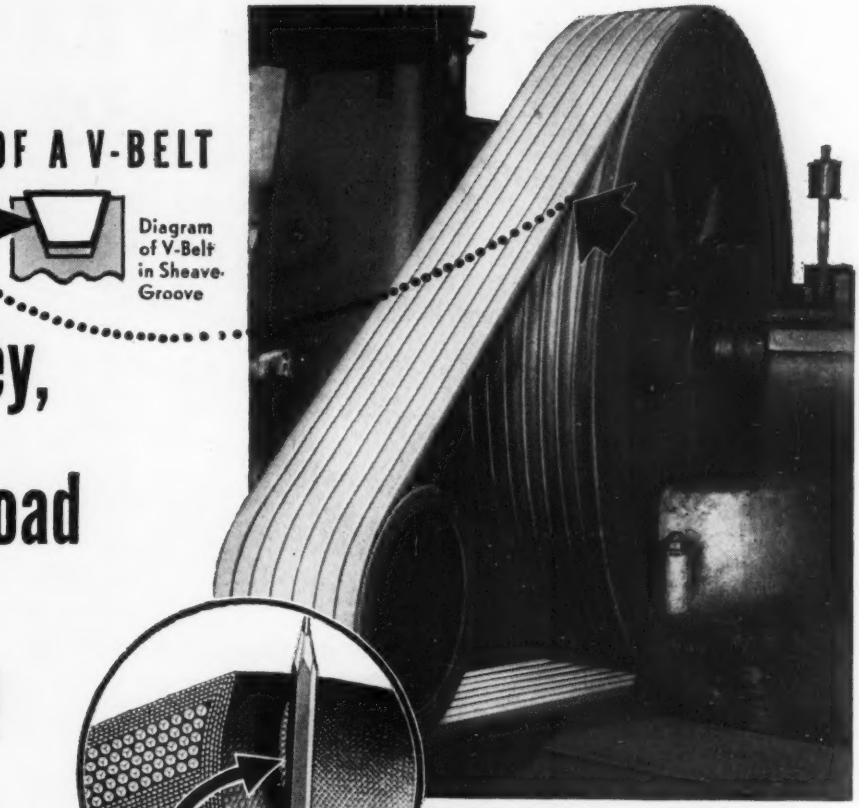
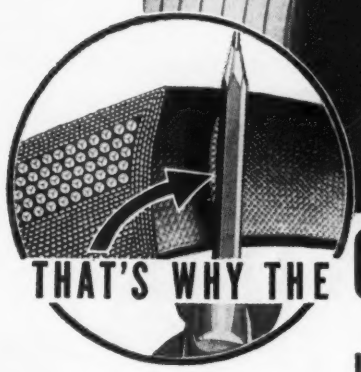


Diagram of V-Belt in Sheave-Groove

Every ounce of load a V-Belt carries must *first* be picked up by the *sides* of the belt. Clearly so, because *only* the *sides* come into contact with the pulley! The sides do all the *GRIPPING* on the pulley. They get all the wear against the sheave-groove wall. The sides *pick up* the load. They transmit that load to the belt as a whole. And then, once more, the sides—and the sides *alone*—grip the driven pulley and *deliver* the power to it.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.



THAT'S WHY THE Concave Side (A GATES PATENT) IS IMPORTANT TO YOU!

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt—and that's why the patented Concave Side is important to you.

The simple diagrams on the left below show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

and the CONCAVE SIDE is more important NOW than ever before!

Now that Gates SPECIALIZED Research has resulted in Super Vulco Ropes capable of carrying much heavier loads—fully 40% *higher horsepower ratings*—the sidewall of the belt is called upon to do even more work in transmitting these heavier loads to the pulley. Naturally, with heavier loading on the sidewall, the life-prolonging Concave Side is more important *now* than ever before!

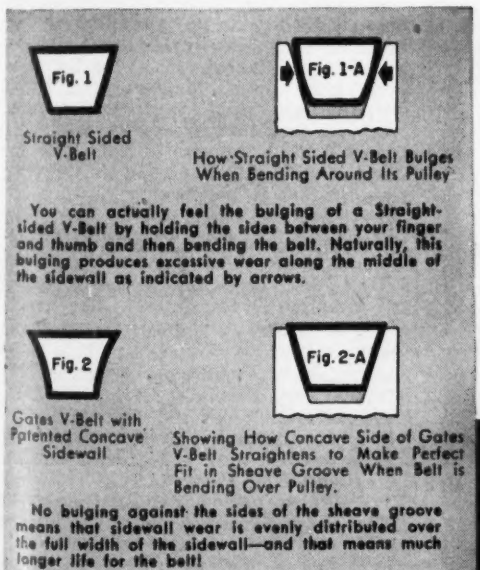


Fig. 1
Straight Sided V-Belt
Fig. 1-A
How Straight Sided V-Belt Bulges When Bending Around Its Pulley
You can actually feel the bulging of a Straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.
Fig. 2
Gates V-Belt with Patented Concave Sidewall
Fig. 2-A
Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt is Bending Over Pulley.
No bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

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DENVER, U. S. A.

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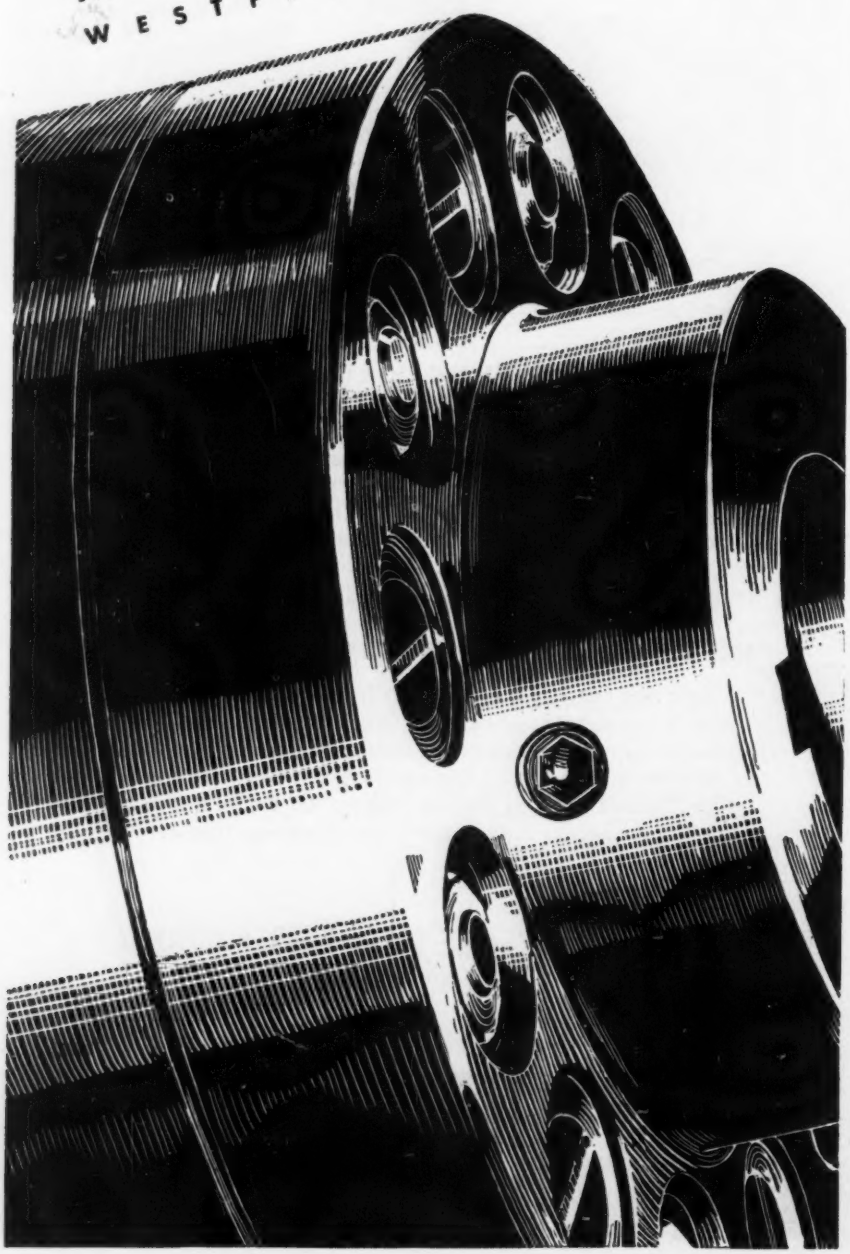


Steel Bars . . .

Bar Prices, Page 100

Pittsburgh—Increased freight absorption on shipments into Detroit, eastern Michigan, and Toledo has resulted in a revision of the arbitrary price differentials at these points, as follows: Detroit, from 15 to 16 cents per 100 pounds; eastern Michigan and Toledo, from 20 to 23 cents. This move involves merchant carbon and alloy bars, hot-rolled and cold-finished, sheets, strip and semifinished items. Some consideration is still being extended toward possible adjustment of carbon steel bar size extras in the smaller classifications. Revisions in sellers' monthly distribution allotment schedules, developing out of the Marshall Plan, are not expected to become operative until second quarter. In the interim, consumers are increasing pressure for prompt deliveries, although this effort has proved fruitless in most instances, particularly for the smaller bar sizes. Cold finishers expect to maintain a relatively high level of operations through most of this year, although output likely will remain well below the war peak and that recorded in immediate postwar period of rebuilding inventory pipe lines.

New York — Hot carbon bar consumers declare it is practically impossible to place tonnage at this time, as producers generally are sold up for the first quarter and are accepting no business for the following three months. By shopping around, consumers are able to pick up a little tonnage in the larger sizes, but this business is relatively negligible. Of course, most consumers are protected to a certain degree by mill quotas, but in most instances supply falls far short of requirements.

In cold-drawn carbon bars and in hot and cold alloys, the situation continues relatively easy. Alloys can be had within five to six weeks, and while small sizes of cold-drawn carbon bars are rather tight, even they can be picked up for shipment before the end of the quarter.

Philadelphia—Hot carbon bar consumers find it difficult to place new tonnage, and most of them could use it, as current quarter quotas are not sufficient to meet their full requirements. Buyers of cold-drawn carbon bars also find the small sizes of rounds and flats difficult to obtain, with some producers actually sold out until June. However, on most other sizes and specifications, consumers can obtain tonnage for shipment before the end of this quarter, and on the alloys can obtain delivery within five to six weeks.

United States Steel Export Co. Revises Price Schedule

New York — United States Steel Export Co., 30 Church St., this city, has made the following advances, effective Jan. 12: Joint bars for standard rails, $4.88 per 100 lbs.; tie plates, $4.86; galvanized sheets, plain, 10 gage, $4.54; and galvanized sheets, corrugated, 10 gage, $4.64.

The new prices include freight to New York, Philadelphia or Baltimore. They are net cash and subject to adjustment to sellers' prices in effect at time of shipment from the mill.

Structural Shapes . . .

Structural Shape Prices, Page 101

Philadelphia — Structural demand includes several substantial projects, although high building costs are placing a damper on activity. Western Savings Fund Society cancelled its plans for going ahead with a new office building at Broad and Chestnut, originally estimated to require 2000 tons. Work will be confined to alterations to the lower floors of the present structure. This is the second large job in this immediate district recently to have either been dropped or at least temporarily suspended pending revision of specifications or the eventual cancellation of the project entirely. The other is the Delaware memorial bridge, near Wilmington, as noted in last week's issue.

New York — Structural demand continues active, with fabricators generally making little if any inroads on order backlogs. Some of the larger interests are unable to promise delivery before next summer. Harris Structural Steel Co. is low on 2500 tons for a power house extension for the Board of Transportation, West 59th St., this city, although action may not take place for another month or so. An apartment at 61 Washington Square involves 1000 tons, placed with Bethlehem Steel Co., Bethlehem, Pa. Several sizable bridge projects are active along the eastern seaboard.

Chicago — While it is known that demand for structural steel during the coming year is going to be substantial—and in excess of productive capacity, new inquiry so far this year is surprisingly light. Likewise, new business awarded is below recent months. The situation is affording fabricators an opportunity to catch up on their commitments. Bidding for new jobs is not spirited, the majority of interests figuring the more attractive projects are those offered by long-time customers. Most shops have six to eight months' orders ahead and cannot be sure they will receive enough plain shape tonnage from mills to meet these obligations on schedule.

Seattle — Local fabricating plants have ample work in hand and are trying to clean up backlogs before taking further commitments. They are seriously handicapped by lack of steel and hesitate to take on large contracts.

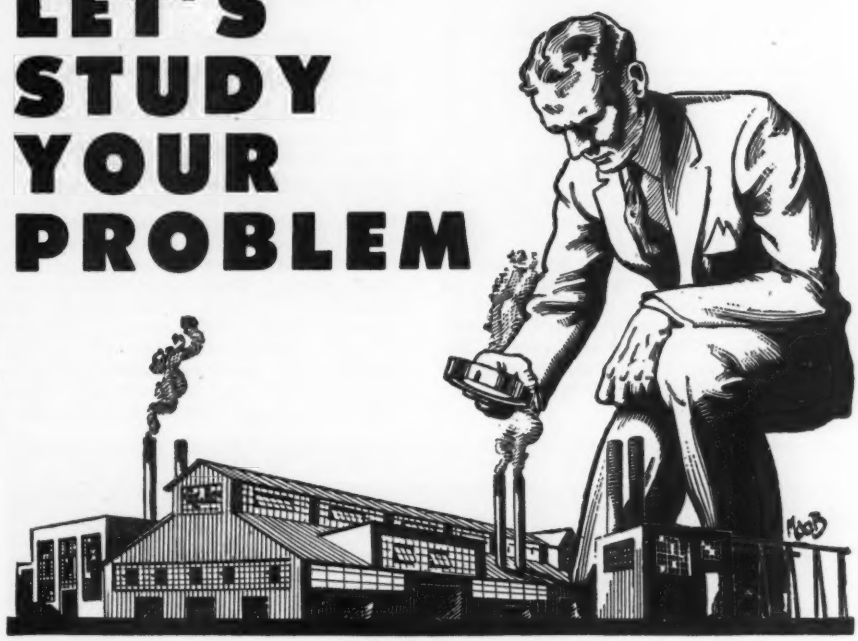
Reinforcing Bars . . .

Reinforcing Bar Prices, Page 100

New York — Two sizable dam projects for the United States Engineers involve 2800 tons for a project near Antlers, Va., and 1500 tons for another one near Buffalo. The Arundel Corp., Baltimore, and associates are low on the latter, with bids being handled through the United States Engineers office at Buffalo, and Morris Knudsen, New York, and associates, on the Virginia project through the Engineers office at Norfolk, Va. Local awards include 250 tons for the St. George ferry terminal, Staten Island. General shortage of reinforcing bars continues pronounced.

Chicago — Short supply of reinforcing steel is the dominant factor restricting the activities of suppliers.

LET'S STUDY YOUR PROBLEM



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Is it Materials Handling?

Is it Processing?

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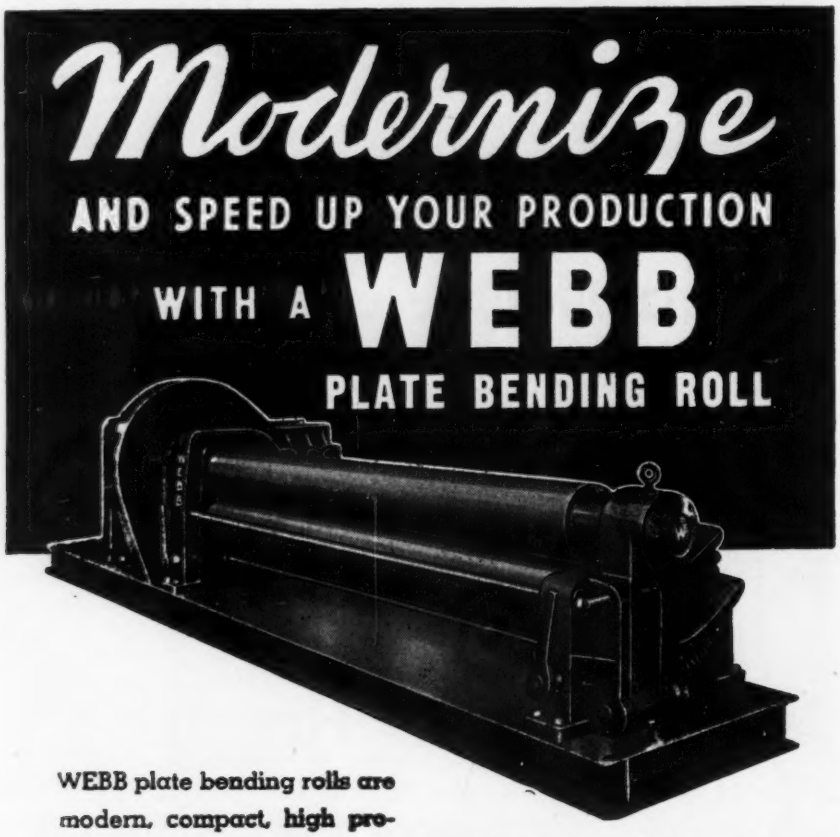
Work out for figuring attracts only mild attention, and the larger the jobs the less the interest. Considering the high cost of construction, and the shortage of practically all types of building materials, however, the volume is surprising. Construction awards in the Chicago area exceed the rate in states east of the Rocky mountains. Contractors, perhaps because of this, find it extremely difficult and slow to cover on their reinforcing needs.

Seattle — Reinforcing bar mill operations are running about 95 per cent of capacity, all plants reporting a continued demand for steel in small tonnages. Efforts are directed toward reducing backlogs but new orders equal output and business on the books remains static.

Tin Plate . . .

Tin Plate Prices, Page 101

Pittsburgh — Output of tin mill products is expected to be well sustained throughout 1948 despite indicated revision in container order M-81 to conserve pig tin stocks. Pending limitations on use of tin plate for beer, oil, coffee and other containers will necessitate shifts from hot dipped to electrolytic, and from electrolytic to bonderized and canmaking quality black plate. Bonderized lines are expected to become more active this year as result of the pending revision in the container order. This will likely result in considerable preparation work on part of producers whose lines have been largely inactive since termination of the war. At least one producer has dismantled its bonderizing line. Reduction in second quarter export quotas to 125,000 tons, including 13,000 on a nonrated basis, is said to be in line with government's efforts to conserve tin.



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Tubular Goods . . .

Tubular Goods Prices, Page 101

Pittsburgh—Some tightening in delivery schedules is noted for both stainless and alloy tubing, while no easing in pressure for shipments of standard pipe and bulk of oil country goods is indicated through first half at least. Indicative of the industry's efforts to modernize and expand production facilities to meet huge pent-up demand for tubing is the recent statement of Jones & Laughlin Steel Corp. to the effect that production of electricweld tubing at its Oil City, Pa., plant nearly doubled in 1947 as result of installation of two electricweld Yoeder process mills, in addition to other production facilities and more storage capacity. It was the second successive year that the plant output doubled that of the previous period. Output of the Yoeder mills at this plant is restricted to relatively small tubing size range of ½ to 1¼-inch. Cast iron pipe producers have not been able to make much headway against very extended order backlogs in recent weeks, due primarily to inadequate pig iron supplies.

Seattle — The cast iron pipe market is quiet although some major jobs are to be up for figures in the near future. Agencies are still handicapped by inability of mills to make prompt deliveries and some competing types of pipe have invaded the cast iron field.

Wire . . .

Wire Prices, Page 101

Philadelphia—Alan Wood Steel Co., Conshohocken, Pa., has advanced prices on cut nails to $6.30 per 100-pound keg, Pittsburgh base.

Following a slight lull early in the month, attributable to seasonal influences, jobbing demand has taken a spurt. However, it is doubtful if January bookings will exceed those in December, which for some resellers was the most active month last year. Nail distributors have increased prices to dealers substantially with a still further increase on direct sales to consumers. This reflects recent adjustments in mill prices.

Pittsburgh — Not all sellers have switched to the column basis of quoting nails, but are expected to as soon as price sheets can be prepared. Additional production emphasis on housing nails is anticipated this year to meet sharply augmented requirements. To this end some companies are installing more nail machines which should make possible a 7 to 8 per cent increase in production during second half of this year. Prospect of revising present nail distribution pattern to relieve areas in critically short supply, such as Eastern Seaboard and Pacific Coast, is not considered likely, according to some sellers. Such action only would aggravate the tight supply situation al-

ready existing at other points. Industry officials contend they are policing distribution of nails as far as possible, cutting off from further supplies all distributors found to be allowing nails to get into the gray market.

Birmingham — One of the district's largest jobbers reports the shortage of wire products, including nails and fencing, is little improved over the most stringent days of the war. Although some tonnage continues to move through these channels, the supply will allow for scarcely more than an effort to placate retailers. The shortage is especially noticeable in rural distribution centers. Approximately same story applies in merchant wire.

Semifinished Steel . . .

Semifinished Prices, Page 100

Pittsburgh—No letup in activity in the semifinished steel market, involving complicated ingot conversion deals, is indicated through most of this year. In fact, tempo of this activity might be increased should the steel export program involve exceptionally large tonnages. Such development would necessitate cutbacks in mill allotments to customers, aggravating an already tight supply situation. Rerolling ingots are said to be selling in the open market within a price range of $90 to $95. The higher of the range represents carbon ingots melted in electric furnaces.

Rerolling billets, blooms and slabs are sold by some interests on a negotiated basis at $85 and higher; sheet bars, in a range of $95 to $105.

Semifinished steel source for operation of rolling mill facilities at the old Shenango tin plate plant of Carnegie-Illinois Steel Corp., recently purchased by Hudson Motor Car Co., has not yet been established. Rumors persist concerning a pending sale of an open hearth and electric furnace at Avonmore, Pa.

Iron Ore . . .

Iron Ore Prices, Page 102

Cleveland — Consumption of Lake Superior iron ore declined to 6,970,335 tons in December from 7,068,284 tons in November and compared with 5,516,483 tons in December, 1946, according to the Lake Superior Iron Ore Association, this city. This brought the adjusted total for 1947 to 80,806,627 tons compared with 62,093,056 tons in 1946. Of last month's total, 6,722.548 tons were consumed by furnaces in the United States, against 6,836,817 tons in November, making the year's adjusted total 77,977,812 tons against 60,290.891 in 1946.

As of Jan. 1, 1948, total stocks amounted to 36,094,870 tons compared with 43,010,488 tons a month earlier and 37,464,533 tons a year ago. Of the total at the beginning of this year, 30,406,284 tons were at furnaces in the United States, 1,342,472 tons at furnaces in Canada, and 4,346,114 tons on Lake Erie docks in this country.

The report revealed a sharp drop in the number of furnaces in blast on Jan. 1, totaling only 178 against 189 on Dec. 1. The decline was due entirely to a drop in the number of furnaces in blast in the United States to 169 from 180, making 14 idle against only 3 idle on Dec. 1.

Rails, Cars . . .

Track Material Prices, Page 101

New York — While a substantial number of freight cars are actively being figured, still others are likely to come up for bidding shortly, including 4000 for the New York Central, as recently noted; orders so far this month have been relatively light. The most recent award involves 1000 hoppers for the Illinois Central. Diesel locomotive demand continues active, with 44 having recently been placed by the Missouri-Kansas-Texas.

Diesel-electric locomotives accounted for 85 per cent of production at American Locomotive Co.'s Schenectary, N. Y., plant during 1947, according to P. T. Egbert, vice president. Steam locomotive production, amounting to 15 per cent of the total, was principally for export. This compares with 75 per cent steam and 25 per cent diesel-electric in 1946. The ratio of steam to diesel types will be further reduced in 1948, Mr. Egbert said. Company's backlog consists of 92 per cent unfilled orders for diesel-electrics and 8 per cent for steam.

Cleveland — Construction of 17 additional tracks in the Chesapeake & Ohio Railway's Walbridge yard at Toledo, O., at estimated cost of $1,500,000 has been authorized by directors of the company.

Birmingham — Illinois Central

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System has placed an order with the Bessemer plant of Pullman-Standard Car Mfg. Co. for 1000 all-steel, 50-ton hopper cars, delivery to begin in September. The order is valued at approximately $4 million.

Warehouse . . .

Warehouse Prices, Page 103

Chicago — Demand for steel so far exceeds supply that warehouses are unable to provide more than token help to consumers who seek to supplement inadequate mill receipts. Warehouses manage to do a fair job of accommodating customers whose needs are miscellaneous and moderate, but they lack inventories to furnish sizable tonnages. Principal shortages are in flat-rolled products, light carbon bars, small structurals and plates. Alloys, stainless and cold-drawn products are in more favorable position, but even here considerable tightening is noted over a few weeks back.

Cincinnati — Jobbers have prepared new price schedules to compensate for higher freight charges. A coincidental change places hot-rolled rounds and squares over 3-1/2 inches, hexagons over 7/8-inch, and flats wider than 6 inches in a higher-priced classification. Demand for scarce items, particularly sheets and plates, is incessant. Meanwhile, warehouse stocks are badly depleted, scarce items moving out as rapidly as mill replacements are received. Demand appears steady at an all-time high.

Seattle — Wholesale jobbers report continued active demand for all out of stock items. Shipments are being forwarded to the job upon arrival and for this reason inventories continue short and badly broken. Sheets, nails, reinforcing and other scarce items continue extremely short with no improvement expected for months.

Pig Iron . . .

Continuing supply tightness creates pressure for new subsidy plans or allocation

Pig Iron Prices, Page 102

Pittsburgh — Most foundries do not expect any relief in the critically tight pig iron supply situation through 1948. Only a small percentage of the prewar merchant iron volume is currently being shipped here from such points as Cleveland, Toledo and Erie; while output of merchant iron in this district has been restricted because of poor quality and nonuniform grades of coke and high price of blast furnace turnings. There is some pressure for a return to some form of subsidy program or enforced allocation of pig iron to meet requirements of favored industries, such as those involved in the government housing program, notably soil pipe producers. Termination of the premium payment plan is said to have resulted in a moderate reduction in pig iron shipments to favored groups under this program. However, industry officials contend many of these consumers were receiving a disproportionate share of monthly output. Some form of voluntary industry-wide allocation of pig iron probably may be established, with praference expected to be given to housing needs.

Philadelphia—Pig iron shipments this month are expected to be slightly higher in this district than in December, although still far short of requirements. The smaller of the two stacks at Swedeland, Pa., running on iron for the merchant trade, has been shifted to malleable and after a short run will finish out the month on basic. It will then go back to foundry iron for a sustained production run.

Buffalo — Hopes of hard-pressed foundries to obtain more pig iron were given another sharp jolting this week as blast furnace operations were expected to plunge in the near future as at least three furnaces were reported on the ragged edge and due for relining. In addition, the blast furnace at Erie was forced down for relining. While this furnace is not included in the district's operating figures, it was a factor in the area market from a supply standpoint.

The anticipated easement in coke supplies as the result of curtailed foundry operations so far has failed to materialize. One of the leading producers announced an advance in oven foundry coke from $18.50 to $20.15, delivered Buffalo. Foundries at six other points in the state are paying $18.50 fob, up 75 cents, except where the return is less than $17 fob Detroit when the price becomes $17 Detroit.

Chicago — Foundries continue their

Special Machine

FEATURES FULLERGRIPT BRUSH

Like many other small metal products that are case hardened, hack saw blades must go through a scale-removing process. One manufacturer of blades — planning to eliminate manual handling by construction of a completely automatic, special scale-cleaning machine, took advantage of gratuitous consultation with Fuller Brush engineers. The result was a special Fullergript rotary brush for this machine. It runs automatically yet is successful in removing scale completely. On similar problems you will find it pays to consult with . . .

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struggle to obtain enough pig iron, also scrap, to maintain a respectable production of castings. These two raw materials, currently in acute shortage, combine to hold melts at levels far below that necessary to supply the demand for castings, and the situation appears to be of more importance to foundry operators currently than the recent $3 a ton increase in pig iron. Cast scrap is commanding from $62 to $65 a ton and railroad malleable scrap from $72 to $75. Higher prices for raw materials make for higher prices of castings, but scattered indications that demand may suffer serves as a partial brake. Of the district's 41 available blast furnaces, 38 are active.

Cincinnati — Foundries are getting the full impact of reduced allotments of pig iron following the holiday shutdowns which conserved raw materials. Forced to rely on uncertain supplies of scrap, and at high prices, some small jobbing foundries may be forced to serious curtailment next month. Rationing of oven foundry coke is continued in face of booming demand. The delivered price is up 85 cents, at $18.95, Cincinnati. The Ironton, O., base is now $16.75, up 75 cents.

Birmingham — Every pound of pig iron available in this section is snapped up in bargain style, even though all three merchant producers have tacked on the $3 increase announced by Sloss-Sheffield Steel & Iron Co., this city, before the first of the year. Little iron is moving to remote points from this district, and the prospects are that even less will be available from here on out. Most pig iron users of the district continue on reduced schedules.

Scrap . . .

Scrap Prices, Page 106

Pittsburgh — Movement of scrap through dealer channels continues on a relatively restricted basis with mills unable to obtain large tonnage commitments at current price levels. Some mills report influx of scrap is substantially below current consumption rate with consequent sharp reduction in inventories over the last six weeks. The reverse is said to be true of scrap accumulating in dealers' yards. Heavy melting steel tonnage on the recent Pennsylvania Railroad list was allocated at $40.50 plus usual 50 cent brokers commission. There appears to be more cast scrap available but at a price prohibitive for many foundries. No easing in pressure for shipments of cast scrap items is expected for months, reflecting indicated critical shortage in foundry pig iron throughout most of this year. There is relatively little heavy breakable cast available here with much of the limited tonnage unsuitable for breaking into cupola cast. Scrap dealers and brokers operating in the city will have to meet additional operating cost burden in form of 1 mill mercantile tax and 1/2 mill school board tax. Consensus is that this tax is out of proportion to margin of profit on scrap handled, with some interests going as far as to state increase in brokers commission may be necessary.

American Bridge Co. plans to start dismantling the old Wabash railroad bridge Feb. 15, with the task expected to take six months. Over 8000 tons of much needed scrap for U. S. Steel Corp.'s furnaces is expected to result from this operation.

Philadelphia — While delivered prices on the principal open-hearth grades of steel scrap are nominally unchanged, cast grades generally have undergone further substantial increases. No 1 cupola cast is now $56 to $57 delivered; No. 1 machinery cast, $58 to $60; charging box and heavy breakable cast, $55 to $56; unstripped motor blocks, $52 to $53; malleable, $70 to $72; clean auto cast, $57 to $58; and No. 1 wheels, $60 to $62.

The tone in steel scrap is slightly easier, with little new to test the market on the principal open-hearth grades. Recently, as noted at the time, a sale of substantial tonnage of No. 1 steel for Phoenixville, Pa., was made at $46. This was at a sharp differential above the No. 2 grade. Whether sellers will be able to duplicate this figure is a question, although it is pointed out that the specifications on the last sale were highly exacting. In some quarters it is considered possible that if the larger mills, in their offerings, can still adhere to the OPA price formula for another few weeks, they may be successful in obtaining an adequate supply of tonnage at the lower levels. As the spring season approaches, there is invariably a freer movement of scrap and often this is

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Cutting accuracy up to 1/64" plus or minus is obtainable with the Hallden Automatic Shear. After cutting, metal is conveyed or stacked depending upon the customer's requirements.

FLEXIBLE DESIGN
Flexible design allows quick change of shear knives and ease in removal of flattening rolls for grinding. Shear knives have four cutting edges and always move in a mutual plane.

RUGGED CONSTRUCTION
Rugged construction permits continued hard use with little attention other than lubrication. Flattening rolls are individually driven to keep maintenance to a minimum.

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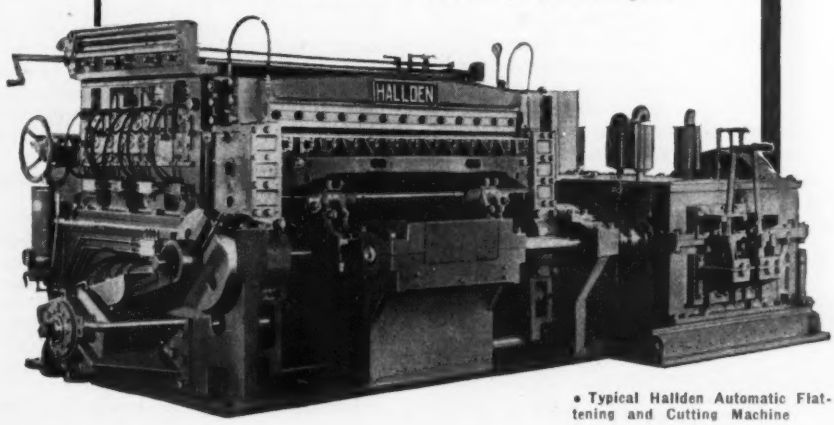

• Typical Hallden Automatic Flattening and Cutting Machine

ThredKut *
INCREASED OUTPUT 4 to 1

... reports
JOHN L. MOROSINI
D. A. Stuart Oil Co.
Representative

"Prior to using THREDKUT,* this customer had tried several types of cutting oil in tapping 1½" dia. x 1" holes in very tough cast steel, with a maximum production of 50 tapped holes before sharpening was necessary. On switching to THREDKUT,* output immediately increased to 200 tapped holes between sharpenings. Here is another instance where THREDKUT* demonstrated its well-established reputation for licking a tough job."

John L. Morosini

ThredKut *

... Stuart's THREDKUT is a unique cutting oil carefully manufactured to insure the maximum benefits from controlled chemical activity. Its outstanding performance on really tough jobs has long been recognized and its flexibility proved through exceedingly widespread use. The many time-tested values built into THREDKUT are serving the leaders of the metal-working industry, increasing efficiency and reducing costs.

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anticipated a month or so ahead by easier prices. However, the current flow of scrap is still light, reflecting in part winter weather conditions. It is estimated that broker-dealer shipments are off one-third to one-half of normal.

The leading Coatesville, Pa., consumer has recently received 8000 tons of scrap from Hawaii. This was the farthest this interest has had to go for scrap. The cargo was unloaded at Philadelphia last week and was comprised mostly of prepared scrap.

New York — Leading New York scrap brokers are offering $34.03, fob shipping point, for the major open-hearth grades, but are unable to obtain tonnage at this figure, and at the moment are offering no higher. Consequently, the market is purely nominal, with Nos. 1 and 2 melting steel, No. 1 busheling and Nos. 1 and 2 bundles at $34.03 and No. 3 bundles at $32.03, these prices all representing the OPA formula.

Recently brokers were offering as high as $37 for No. 1 melting steel and $36 for the other principal open-hearth grades. However, these prices have now disappeared.

Cast iron scrap prices, however, are higher, with brokers offering $51 to $52, fob shipping point, for No. 1 cupola and charging box cast, $50 to $51 for heavy breakable, $47.50 to $48.50 for unstripped motor blocks and $60 to $62 for malleable.

Buffalo — Tension in the scrap market reached the boiling point this week as the Bethlehem Lackawanna plant shut down three open hearths because of inadequate scrap supplies. Except for limited sales, mostly to nonintegrated consumers, the stalemate between leading mills and dealers showed no signs of breaking. Leading mills continue to stick to their $39.75 bid for No. 2 heavy melting and bundles with dealers insisting the prevailing market is $1 to $2 higher. According to dealers, mills have sent out the word that open hearths will be shut down before mills do business at dealers' asking prices. The situation became even more disturbing with the possibility that additional furnaces will be withdrawn in February if the flow of scrap does not increase.

The withdrawal of furnaces here is said to have followed a meeting of top mills (in New York) at which time the decision was reached that leading consumers would not pay more than $20.75 above the old OPA levels for steelmaking grades.

Meanwhile, minor activity among the smaller buyers continues at quoted ranges. The feeling that No. 1 heavy melting and No. 2 material should no longer be quoted at the same range is becoming more in evidence among dealers. STEEL separated the two grades in Buffalo during mid-1947 after numerous complaints from dealers that the old wartime practice was unfair. Sales of No. 1 heavy melting are reported as high as $45.

Cleveland — The scrap market was quiet here last week, and prices remained unchanged, even on foundry grades, which in recent weeks have been on the upgrade. However, the scrap shortage was becoming increasingly acute as the result of cold weather which reduced collection and preparation activities.

Detroit—Prices are holding firm here and a good tonnage is moving currently. Mills refuse to budge from the price formula and if they can hold to this policy another 30 days it is the feeling they will have broken the market as far as any upsurge is concerned.

Cincinnati — Steelmaking grades of scrap are still holding at the formula price. Mill reserves, although not extensive, may mitigate against any break-through originating in this district. Cast scrap tends higher although the bidding for available material is spotty, with evidence that some foundries are trying to resist the recent increases. Shipments are considered fair in face of the coldest weather of the winter.

Kansas City, Mo. — Establishment of a Kansas City mill delivered price for heavy melting steel scrap at $37 a gross ton, an increase of $3.50 a ton over the previous levels when purchases were based at Chicago was announced last week by Sheffield Steel Corp., this city. At the same time, a price of $34.50 a ton was established for the Houston, Tex., plant of Sheffield Steel of Texas, a division of the American Rolling Mill Co. After deducting the usual 50 cents a ton arbitrary switching charge, the new mill delivered prices in Kansas City and Houston establish levels of $36.50 and $34, respectively, at dealers' yards.

The action was seen here as a move to protect the local supply of scrap steel, much of which has been moving elsewhere in the recent "wild" scrap market at prices $3 to $4 a ton above levels bid by rolling mills which sell their products at established prices.

Seattle — The steel scrap situation continues "touch and go," receipts about equaling consumption, inventories nonexistent. Shipments declined last week due to unfavorable weather. The next six weeks are viewed with some apprehension following which heavier shipments from the country and larger production by shipbreaking plants are expected to carry plants through the balance of the year.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 102

Pittsburgh — Stronger price tone has developed for Connellsville foundry beehive coke, with some sales of representative tonnage reported up 50 cents to $15.50 per net ton. The higher price is said to reflect increased demand resulting from scheduled cessation of oven foundry coke shipments Feb. 1 from the Fairmont, W. Va., by-product ovens purchased by Sharon Steel Corp. Price of oven foundry coke from Fairmont ovens delivered Pittsburgh is $18.31 on basis of higher freight rates now in effect. Some tonnage of oven foundry coke is coming into this district from Daingerfield, Texas, within price range of $25 to $27.

Rainey-Wood Coke Made Division of Alan Wood

Rainey-Wood Coke Co., wholly owned subsidiary of Alan Wood Steel Co., Conshohocken, Pa., has been merged with the parent company and will be operated as the Coke & Chemicals Division.

Scrap Supplies To Continue Restricted

(*Concluded from Page* 27)

ries were vitally affected by high scrap prices which represent about 60 per cent of their iron mixtures. They have watched their melted metal treble in cost in less than two years. They have encountered resistance in passing these increased costs on to their customers. Lower scrap quality has meant more shop defectives and this has still further increased manufacturing costs and buyer resistance. He felt that scrap suppliers can do much to keep inflation out of the scrap market, and that the foundries can help by not bidding against themselves for a limited supply.

Needs To Expand—Walter Janssen, consultant for metals and minerals, Department of Commerce, pointed out that the current short supply position is only incidental to those which will be necessary to serve the requirements of an ever-expanding population.

"It has been computed that the population of the United States in 1970 will be 156 million persons," he said. "It has also been computed that the steel production in 1970 will be about 12 million tons more than in 1947. It is estimated that about 72 million tons of iron and steel scrap will be required to serve that economy. If the open hearth is to continue to be the dominant steelmaking process, then the scrap industry as purveyors for the foundries and steel mills are going to be called upon to find about half of that 1970 scrap tonnage or at least 36 million tons of purchased scrap each year, an amount about 11 million tons higher than the 25.4 million ton peak in 1947."

The speaker went on to say that some people are of the opinion this is an impossible goal, and they visualize the rejuvenation of the bessemer converter either as a process for making steel ingots or synthetic scrap.

Cites Industry's Progress—In his remarks as executive secretary of the institute, Edwin C. Barringer highlighted the progress of the industry since formation of the organization. While the matter of scrap supply is paramount and the dealers and brokers will continue to exert all justifiable means for making a maximum of scrap available to consumers, still there are collateral objectives on which the industry must make a start in 1948, he said. He suggested consideration be given to the pooling of resources to accelerate the return of overseas scrap; consideration of a proposal to abandon the gross ton in favor of the net ton in the industry; consideration of the small businessman's priority in the marketing of war surplus; closer cooperation between all branches of the industry, particularly in the field of public relations; thought be given to revision of specifications, which have stood unchanged for almost 15 years; consideration be given to the improvement of the appearance of scrap yards through inexpensive landscaping, etc.

The convention was one of the largest ever held by the institute, well over 1000 members and guests participating. At the annual business session the following new directors were elected: Mose Temerson, Charles Temerson & Son, Tuscaloosa, Ala.; Amos Bowman, Luria Bros. & Co., Pittsburgh; Darwin S. Luntz, Luntz Iron & Steel Co., Canton, O.; Marvin S. Plant, H. Klaff & Co., Baltimore; Al Levinson, General Pipe & Supply Co., Bell, Calif.; Harold Weinstein, Calumet Iron & Supply Co., East Chicago, Ind. Directors reelected were: A. P. Ashner, St. Louis; Abe Byer, American Compressed Steel Corp., Cincinnati; Clarence C. Cohen, I. J. Cohen & Co., Kansas City, Kans.; David C. Holub, Holub Iron & Steel Co., Akron, O.; Milton K. Mahler, Morrow Steel Co., Detroit; and I. W. Solomon, I. W. Solomon Co., Pittsburgh.

New officers were elected as follows: President, Harman D. Moskowitz, Schiavone-Bonomo Corp., Jersey City, N. J.; first vice president, Edward L. Solomon, Max Solomon Co., Pittsburgh; second vice president, Marshall Shapiro, California Metals Co., Oakland, Calif.; secretary, Stanley M. Kaplan, M. S. Kaplan Co., Chicago; treasurer, Samuel G. Keywell, the Samuel G. Keywell Co. Inc., Detroit; comptroller, Thomas F. Kelly, Flushing, N. Y. Edwin C. Barringer was elected executive vice president. His title the past year has been executive secretary.

Host of the convention was the Chicago chapter of the institute headed by William Pohn. At the banquet Vincent Gottschalk was toastmaster.

Producers of Special Machinery Boost Output

(*Continued from Page* 33)

out the industry, making supply rather than efficiency an important factor in the industry's production. Last year's output was estimated at about 10 per cent higher than in 1946 and

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about 50 per cent greater than in prewar.

Worthington Pump & Machinery Corp., New York, tells a somewhat different story from the industry as a whole. Making a broad range of products for oil refineries—centrifugal compressors, centrifugal, steam and rotary pumps, chillers, exchangers, steam turbines, and diesel and gas engines—the company estimated its 1947 unit output at two and a half times the prewar volume and 25 per cent greater than in 1946. During 1947 the company's order backlog increased about 20 per cent but showed signs of contracting in the latter part of the year. In relation to prewar, the company expects demand to level off at about three times the former level in dollar volume, with this point possibly to be reached in second or third quarter, 1948.

Textile — With order backlogs for textile machinery extending anywhere from one to five years, builders expect the present high volume of production to continue for an indefinite period. The National Association of Textile Machinery Manufacturers places this volume at about 50 per cent higher than prewar. As the result of foreign demand for this type of machinery, to a large extent due to the destruction of German productive capacity, some companies, however, have boosted their output far above the industry average. James Hunter Machine Co., North Adams, Mass., for example, places its 1947 volume at about 15 per cent above 1946 and 600 per cent higher than in the prewar period.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2200 tons, power house extension, Graham, W. Va., to American Bridge Co., Pittsburgh.

1900 tons, 18 buildings, Carbide & Carbon Chemicals Corp., Texas City, Tex., to Virginia Bridge Co., Roanoke, Va.

1000 tons, apartment, 61 Washington Square, New York, to Bethlehem Steel Co., Bethlehem, Pa.

736 tons, tunnel bracing, contracts 3 and 4, South Side Intercepting sewer, Sanitary District of Chicago, to Commercial Shearing & Stamping Co., Youngstown, O.; S. A. Healy Co., Chicago, and Peter Kiewit Sons Co., Chicago, joint contractors.

735 tons, Trommer Brewery garage, Orange, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

550 tons, Bamberger store, Morristown, N. J., through Mahony Troast Construction Co., Passaic, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

540 tons, bridge, No. 5514, St. Paul, for State, to Bethlehem Steel Co., Bethlehem, Pa.; M. E. Souther Inc., St. Paul, contractor; bids Jan. 9.

480 tons, refinery expansion, Gulf Refining Co., Toledo, to Duffin Iron Co., Chicago.

400 tons, building, Darling & Co., Chicago, to Duffin Iron Co., Chicago.

300 tons, Washington state bridge, Lake Crescent, to Poole & McGonigle, Portland, Oreg.; Paul Jarvis, Seattle, general contractor.

300 tons, building, Rheem Mfg. Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

270 tons, New York state bridge, Clinton county, to American Bridge Co., Pittsburgh.

200 tons, New York state bridge, Orange county, to American Bridge Co., Pittsburgh.

185 tons, Washington state bridge near Vancouver, to Poole & McGonigle, Portland, Oreg.; J. J. Badraun, general contractor.

100 tons or more, gates and hoists, Columbus Basin project, to Northwest Marine Iron Works, Portland, Oreg., $15,202.

STRUCTURAL STEEL PENDING

6000 tons, East bridge, Washington, D. C., Bethlehem Steel Co., Bethlehem, Pa., low.

5080 tons, Chesapeake bridge, contract No. 2, superstructure, Chesapeake City, Md.; American Bridge Co., Pittsburgh, low.

2500 tons, power house extension, Board of Transportation, West 59th St., New York, Harris Structural Steel Co., low bidder at $654,955.

2400 tons, Pennsylvania state bridge work, Huntington county, bids Jan. 30.

1000 tons, building, Du Pont interests, Wilmington, Del., for construction at Ashtabula, O.

1000 tons, switchyard and other structures, Coulee dam; bids to Bureau of Reclamation, Denver, Feb. 17.

775 tons, Fall Creek local control project, including 9-span bridge, Indianapolis; bids of Jan. 8 rejected; new bids to U. S. Engineer, Louisville, Ky., Jan. 30.

700 tons, Woolworth store, Chestnut St. near Broad, Philadelphia; Turner Construction Co., general contractor on fee basis.

550 tons, office, Revillon Freres, East 55th St., New York, bids asked.

450 tons, spillway bridge, Bloomington, Nebr.; bids Jan. 27.

440 tons, warehouse, Beck Co., Bronx, New York, pending.

400 tons, school, Oak Lawn, Ill.; bids Dec. 28.

325 tons, piling, including 300 tons, bearing piling and 25 tons sheet piling, Fond du Lac dam, East Peoria, Ill.; Central Engineering Co., Davenport, Iowa, low on general contract; bids to U. S. Engineer, Chicago, Jan. 19.

200 tons, structures for Bonneville Power Administration; Albina Engine & Machine Co., Portland, Oreg., low $46,379.

135 tons, bridge, No. 3986, Red Lake Falls, Minn., for state; bids of Jan. 9 rejected.

110 tons, bridge, No. 2929, Burr Oak, Ind., for State Highway Department; bids Jan. 13 rejected.

110 tons, bridge, No. 2930, Vincennes, Ind., for State Highway Department; Grady Bros. Construction Co., Indianapolis, low on general contract; bids Jan. 13.

Unstated tonnage, warehouse addition, Abarry Steel Co., Perth Amboy, N. J., bids asked.

REINFORCING BARS . . .

REINFORCING BARS PLACED

4564 tons, contracts 3 and 4, South Side intercepting sewer, Sanitary District of Chicago, to Carnegie-Illinois Steel Corp., Chicago; S. A. Healy Co., Chicago, and Peter Kiewit Sons Co., Chicago, joint contractors.

1589 tons, Medicine Creek dam, Cambridge, Nebr.; to Truscon Steel Co., Youngstown, O.; C. F. Lytle Co., Sioux City, Iowa, contractor.

1100 tons, West canal project, Columbia Basin, to Gilmore Fabricators, low $118,328.

435 tons, store building, Bond Clothes, Chicago, to Ceco Steel Products Corp., Cicero, Ill.; Sumner S. Sollitt & Co., Chicago, contractor.

300 tons, plant addition, Carolina Giant Ce-

Bigwood machines for reeling, straightening, burnishing or de-scaling of bars and tubes are used by leading steel manufacturers in all parts of the world. We show here high speed tube and bar straighteners, a large tube reeler and a small reeler of conventional type. Bigwood patented high speed straighteners will cater for bars from ¼" to 8" diameter and, in the tube range, will deal with tubes up to 18" diameter.

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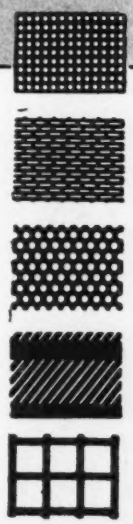

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ment Co., Harleyville, S. C., to Bethlehem Steel Co., Bethlehem, Pa.; MacDonald Engineering Co., Chicago, contractor.

250 tons, St. George ferry terminal, New York, to Bethlehem Steel Co., Bethlehem, Pa.

130 tons, Dearborn St. Subway, cont. T-9B, Department of Subways and Superhighways, Chicago, to Carnegie-Illinois Steel Corp., Chicago; Leininger Construction Co., Chicago, contractor; bids Nov. 13.

125 tons, state highway bridge, Lake Crescent, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Paul Jarvis, Seattle, general contractor.

110 tons, state highway bridge, Vancouver, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; J. J. Badraun, general contractor.

100 tons, foundation for addition, Florsheim Shoe Co. Inc., Chicago, to Inland Steel Co., Chicago; Campbell-Lowrie-Lautermilch Corp., Chicago, contractor.

REINFORCING BARS PENDING

2800 tons, Bugs Island dam, near Antlers, Va., bids recently closed by United States Engineers Office, Norfolk, Va., with Morris & Knudsen, New York, and associates, low.

1500 tons, Mt. Morris dam, near Buffalo, bids closed through United States Engineers Office, Buffalo, with Foundel Corp., Baltimore, and associates, low.

1100 tons, right powerhouse, Coulee dam; bids to Bureau of Reclamation, Denver, Feb. 17.

350 tons, Coulee dam project; bids to Bureau of Reclamation, Denver, Feb. 17.

300 tons, Fond du Lac dam, East Peoria, Ill.; Central Engineering Co., Davenport, Iowa, low on general contract; bids to U. S. Engineer, Chicago, Jan. 19.

165 tons, Fall Creek protection work, including 9-span bridge, Indianapolis; bids of Jan. 8 rejected; new bids to U. S. Engineer, Louisville, Ky., Jan. 30.

110 tons, gravity dam, Bonner's Ferry, Ida.; bids to city, Feb. 3.

100 tons, Washington state highway project; bids in.

Unstated, two concrete spans, Multnomah and Linn counties; bids to Oregon State Highway Commission, Portland, Oreg., Feb. 2 and Feb. 3, respectively.

PLATES . . .

PLATES PLACED

800 tons, 16 tanks, Carbide & Carbon Chemicals Corp., Texas City, Tex., to unnamed fabricator.

500 tons, 40 pressure vessels, Carbide & Carbon Chemicals Corp., Texas City, Tex., to Ingalls Iron Works, Birmingham, Ala.

PIPE . . .

CAST IRON PIPE PLACED

210 tons, Port Angeles, Wash., to American Cast Iron Pipe Co., Universal and Pacific States Pipe Co.

CAST IRON PIPE PENDING

100 tons, also alternatives, for Cle Elum, Wash.; bids in.

RAILS, CARS . . .

RAILROAD CARS PLACED

Illinois Central, 1000 fifty-ton hopper cars, to Pullman-Standard Car Mfg. Co., Chicago.

LOCOMOTIVES PLACED

Manila Railway System, seven 4-8-2 steam locomotives, to Vulcan Iron Works, Wilkes-Barre, Pa.

Missouri - Kansas - Texas, 44 diesel - electric freight locomotives, with 20 going to Electro-Motive Division, General Motors Corp., La Grange, Ill.; 16 to American Locomotive Co., New York; and 8 to Baldwin Locomotive Works, Eddystone, Pa.

CONSTRUCTION AND ENTERPRISE

ARKANSAS

PARIS, ARK.—Avonset Corp., 38 First St., San Francisco, has awarded a $500,000 contract to Austin Co., 510 N. Dearborn St., Chicago, for design and construction of a milk processing plant.

CALIFORNIA

EL CHICO, CALIF.—Radco Mfg. Co. Inc. has been formed by Alton B. Wheeler and associates with a capital of $75,000 to manufacture automotive trailers. Firm's address is 1132 S. Chico Ave.

LONG BEACH, CALIF.—Kaiser-Frazer Corp., Willow Run, Mich., plans to spend about $2,500,000 in further equipping and opening its assembly plant here.

LOS ANGELES—Lehigh Metals Co. has been incorporated with a capital of $100,000 by A. F. Barnard and associates to manufacture and deal in steel, aluminum and other metals. Firm is represented by Paul C. Jones, 810 S. Spring St.

FLORIDA

DADE COUNTY, FLA.—Standard Oil Co., E. W. Bowen, district supervisor, 61 N. W. 11th St., Miami, has awarded a $178,000 contract to Mangham-Butler Inc., 3128 Coral Way, Miami, for an office, warehouse and storage shed at 1000 N.W. 73rd St.

GEORGIA

ALBANY, GA.—Georgia Power Co., 78 Marietta St. N. W., Atlanta, has awarded a $100,000 contract to Blythe Bros. Co., Box 989, Charlotte, N. C., for construction of powerhouse superstructure for Plant Mitchell.

ATLANTA—Standard Oil Co. of Kentucky, D. P. Murphey, district manager, plans construction of a bulk plant on Bankhead Ave. Cost is estimated at $800,000.

ATLANTA—Southern Railway, J. D. Akers, chief engineer, MacPherson Square, Washington, plans to build a $132,000 diesel locomotive repair shop.

DECATUR, GA.—Southern Tractor & Equipment Co., c/o contractor, has awarded a $150,000 contract to Mion Construction Co., 377 Techwood Dr. N.W., Atlanta, for erection of a warehouse and office.

ILLINOIS

CHICAGO—Chicago Coin Machine Co., 1725 Diversey St., has awarded a $160,000 contract to Lee Construction Co., 127 N. Dearborn St., for the erection of a factory.

DEERFIELD, ILL.—Tractomotive Corp., Hillside, has awarded a $150,000 contract to R. G. Regan Co., Joliet, for construction of a factory and office building.

EAST ST. LOUIS, ILL.—Socony-Vacuum Oil Co., 26 Broadway, New York, will build petroleum processing plants costing $2 million.

KANSAS

ULYSSES, KANS.—Stanolind Oil & Gas Co., First National Bank Bldg., Wichita, plans to build a $100,000 gasoline extraction plant near here.

WICHITA, KANS.—Coleman Co. Inc., 250 N. Francis St., will build a $300,000 warehouse. Plans are by Lorentz Schmidt, McVey & Peddie, 1832 E. Second St.

MICHIGAN

DETROIT—Automotive Spring Corp., 2627 Magnolia, has been formed by Timothy G. Meulenberg with a capital of $200,000 as a general manufacturing business.

DETROIT—Meier Brass & Copper Co., 1155 Bellevue, has been formed by Robert J. Meier with a capital of $150,000 to manufacture industrial supplies and equipment.

EAST DETROIT, MICH. — Multi-Hydromatic Welding & Mfg. Co., 23171 Groesbeck Highway has been formed by Richard P. Joy Jr. with a capital of $300,000 to manufacture and sell welding and industrial equipment.

MT. CLEMENS, MICH.—Endres Equipment Co., 366 N. Gratiot Ave., has been formed by Fred Endres with a capital of $100,000 to manufacture and sell agricultural machinery.

MINNESOTA

ST. PAUL—J. A. Price & Associates, 247 Fourth Ave. S., Minneapolis, has awarded an $85,000 contract to C. N. Kurup, 1528 Fourth St., for construction of a parts depot. Lessee is Buick Motors Division of General Motors Corp., 500 Foshay Tower, Minneapolis.

MISSISSIPPI

GREENVILLE, MISS.—A nitric manufacturing plant will be built here at a cost of $1,951,000. Ammonia plant will also be constructed at a cost of $10 million. M. T. Reed is in charge of the project sponsored by Mississippi Agricultural College.

JACKSON, MISS.—General Electric Co., Harold Haase, manager of Jackson Works, has begun work on a $750,000 expansion program at its fluorescent lamp plant. General contractor is M. T. Reed Construction Co., P. O. Box 1066.

MISSOURI

ST. LOUIS—Mines Equipment Co., 4215 Clayton Ave., plans to build a bar-joist plant and office at 4235 Clayton Ave. Architect is N. I. Bailey, c/o owner.

ST. LOUIS—Roesch Enamel Range Co., N. 24th St., Belleville, Ill., plans to build a $300,000 stove plant on Gustine Ave. near Delor St.

ST. LOUIS—Transcentral Oil Corp., E. G. Richardson, president, 600 S. Michigan Ave., Chicago, will build a $100,000 project here to include an oil blending and distributing plant, storage facilities, etc.

MONTANA

BILLINGS, MONT.—North Star Refining Co. plans to build a $250,000 oil refinery here.

NEW JERSEY

ELIZABETH, N. J.—Central Rail Road of New Jersey, A. M. Zubriskie, chief engineer, plans to build a $10 million freight yard south of proposed route 100.

PLAINFIELD, N. J.—Meltzer Corp., Bronson Bldg., will build a $150,000 factory at Leland and North Aves.

NEW YORK

CHEEKTOWAGA, N. Y.—Weisner-Rapp Co., 212 Winchester Rd., will build a $165,000 plant on Walden Rd.

OHIO

CLEVELAND—Cleveland Range Co., 3333 Lakeside Ave., will expand into the production of small steam cooking equipment. Firm has been specializing on commercial and institutional steam cookers.

CLEVELAND—Yoder Co. is spending about $275,000 for new machinery and for the organization of a new roll department.

PENNSYLVANIA

ERIE, PA.—Erie Engine & Mfg. Co. suffered fire recently with damage estimated at $125,000. New equipment will be installed.

ERIE, PA.—General Electric Realty Corp., 3525 Main St., has awarded a $400,000 contract to H. Platt Co., 1104 Salinger St., for construction of a building and additions to two others.

HANOVER, PA.—R. S. Pitts Mfg. Co., High St., has awarded separate contracts totaling $75,000 for construction of a factory.

PITTSBURGH—Westinghouse Electric Corp., 575 Sixth Ave., will build a $500,000 steel supply house on General Robinson St.